

ANNOUNCEMENTS 1965-66



NORTH CENTRAL REGION **Barker Memorial Center**

Michigan City

PURDUE UNIVERSITY BULLETIN

Michigan City Center
NORTH CENTRAL REGION
Announcements for the Year 1965-66

PURDUE UNIVERSITY



Ninety-first Year

LAFAYETTE, INDIANA

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PURDUE UNIVERSITY

Division of University Campuses

Lafayette, Indiana

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General Information

ADMISSION

All inquiries regarding admission to Purdue University as well as requests for application forms should be addressed to the Admissions Office of the campus or center at which the applicant wishes to enroll. The application should be filled out according to the instructions on the form and submitted to the high school from which the individual graduated. The high school will complete the application and forward it to the campus or center indicated by the student. Prospective students should make application during the seventh semester of high school. This enables the University to notify the applicants of tentative action before they graduate.

Acceptance for admission will depend upon three factors: subject matter requirements, class standing, and College Board examination results.

1. Subject Matter Requirements. All areas of specialization at Purdue require one unit of algebra, one unit of plane geometry, one unit of laboratory science, three units of English, one unit of social studies, three additional units of one or more of these subjects mentioned; a total of not less than 15 units; and finally high school graduation. In addition, the Schools of Engineering and the School of Science require one half unit of advanced algebra and one half unit of trigonometry, and the School of Industrial Management requires one half unit of advanced algebra. The Department of Physical Education for Men does not require units in algebra and plane geometry.

School, Division, or Department	High School Graduation	1 Unit Algebra	½ Unit Advanced Algebra	1 Unit Plane Geometry	½ Unit Trigonometry	1 Unit Laboratory Science	3 Units English	1 Unit Social Studies	Total of Not Less Than 15 Units
Agriculture and Forestry	x	x		x		x	x	x	x
Engineering	x	x	x	x	x	x	x	x	x
Home Economics	x	x		x		x	x	x	x
Humanities, Social Science, and Education	x	x		x		x	x	x	x
Industrial Management	x	x	x	x		x	x	x	x
Physical Education (Men)	x					x	x	x	x
Science*	x	x	x	x	x	x	x	x	x
Technology	x	x		x		x	x	x	x
Veterinary Science and Medicine	2 years of preveterinary curriculum								

* Includes prepharmacy.

High school students who desire to take engineering and who expect to get the degree in eight semesters under the regular engineering curriculum should obtain credit in the following high school subjects in addition to the minimum requirements listed above: a fourth semester of algebra and a full unit of both physics and chemistry.

2. **Class Standing.** Preference is given to applicants in the upper half of their high school graduating class. Students ranking in the lower half of their graduating classes (lowest third if application is for School of Agriculture or School of Technology) will be considered as special cases. On the basis of examination results, high school record, and any other pertinent information, one of the following actions may be taken:
 - a. Granted unqualified admission.
 - b. Admitted on one-semester probation.
 - c. Admission postponed until an adequate academic background can be demonstrated.
3. **College Entrance Examination Board Tests:** All applicants who have not completed a full year of college work are *required* to take both the Scholastic Aptitude Test (SAT) and achievement sections of the College Entrance Examination Board. Results of the achievement tests in English, mathematics, and chemistry are required, except that a student who has not had or is not taking chemistry may substitute the test for the science area which he has studied. Students who have had three years or less of mathematics should take the intermediate mathematics achievement test; those who have had more than three years should take the advanced mathematics test.

NONRESIDENT ADMISSION

Out-of-state applicants must rank in the top half of their graduating class or in the top half of the College Board examinations to qualify for admission. Such applicants who are qualified will be considered in numbers consistent with the facilities of the University campus concerned. The individual campus or center reserves the right to alter admission requirements for this group as the situation requires.

TRANSFER STUDENTS

An applicant transferring from another college or university must follow this procedure:

1. Submit an application for admission on the prescribed form through the high school from which he was graduated.
2. Forward an official transcript of work done in institutions previously attended.
3. Provide the completed application, including all items specified above, prior to a deadline established by the admissions officer.
4. An average of at least "C" for Indiana applicants and "B" for out-of-state applicants for all courses previously taken at a recognized college or university is required.

TEMPORARY STUDENTS

Persons who desire to take advantage of the instruction offered in any of the departments of the University without undertaking one of the regular plans of study and without becoming a candidate for a degree may be admitted as temporary students. Such students must present satisfactory evidence that they are prepared to undertake the work desired. The registration of a temporary student will be restricted to the academic year, or the part of it, for which admission is granted, and will be terminated with the beginning of each new academic year unless a new application for admission as a temporary student is approved. Application for admission as a temporary student should be made to the Admissions Office of the campus or center involved. Temporary students are expected to maintain a grade-point average equivalent to regular students as outlined on pages 9, 10, and 11.

REGISTRATION

- a. Preregistration—Current students should preregister for fall, spring, and summer sessions at announced times. New students should preregister at the times specified by the admissions officer. Preregistration eliminates standing in line and assures preferential scheduling.
- b. For students who cannot preregister, a two-day registration period is held just prior to the beginning of classes. Consult the calendar on the inside front cover for dates.
- c. Late registration lasts one week, from the first day of class.

WITHDRAWAL

In order to effect a withdrawal from any class, a student must notify the campus or center office at the time of withdrawal. Discontinuance of class attendance is not the basis for withdrawal, and students who do not notify the office when they plan to withdraw will be given a failing grade in each course involved.

DROPPING AND ADDING COURSES

A student may add a course to his schedule only during the first week of class. To drop a course he should consult the fee refund schedule on the next page and the directed grades explanation on page 9.

UNIVERSITY FEES

Since catalog copy is, of necessity, prepared several months in advance, fees are subject to change by the Board of Trustees without notice.

Course Fees. For courses numbered 100-499, the fee for Indiana residents is \$15 per credit hour plus \$4 per laboratory hour; the fee for nonresidents is \$18 per credit hour plus \$4 per laboratory hour. For courses numbered 500 and above, the fee for Indiana residents is \$18 per credit hour plus \$4 per laboratory hour; the fee for nonresidents is \$21 per credit hour plus \$4 per laboratory hour. This fee schedule may not necessarily apply to special programs.

Late Registration Fees. In addition to the regular course fees, students who register late must pay \$2 per course with a maximum of \$10 and a minimum of \$5 per student always to apply. This is currently effective at the Calumet Campus and Indianapolis Campus.

Breakage Fees. Course fees include the cost of normal breakage and wear and tear on equipment. An additional charge will be levied against individuals for excessive waste, loss, or breakage that may occur. Such special charges must be paid before course credit will be given.

Activity Fees. Students enrolled in 12 semester hours or more at the Calumet Campus, Indianapolis Campus, or Fort Wayne Center pay an activity fee of \$3 per semester. Students carrying 8-11 semester hours pay a \$2 activity fee and those carrying 1-7 hours pay \$1 per semester.

Special Examination Fees. For advanced credit for students who are not paying full fee—per course \$25.

Refunds. Course fees will be refunded under any one of the following conditions:

1. Withdrawal during first and second weeks of semester, 80 per cent refund.
2. Withdrawal during third and fourth weeks of semester, 60 per cent refund.
3. Withdrawal during fifth and sixth weeks of semester, 40 per cent refund.
4. Withdrawal after sixth week of semester, no refund.
5. No refund in flight courses.

Students who register for a course and do not attend class will be withdrawn as of the first day of class and entitled to a refund of 80 per cent of the course fees paid.

Deposits on equipment are subject to regular service and breakage charges.

Refunds are not transferable from one registration period to another or from one student to another.

To be eligible for a refund the student must notify the extension office and apply for a refund at the center or campus where he is registered at the time of his withdrawal.

INSURANCE

Hospitalization insurance is available to students at a reduced rate. The Purdue student insurance can only be obtained at the beginning of the first and second semesters by making application at the business office. This insurance program provides hospitalization, surgical, and medical coverage for the student during the calendar year.

GRADES

Instructors will assign each student a grade for each course in which he is enrolled at the close of a session. The student shall be responsible for the completion of all required work by the time of the last scheduled meeting in the course unless his assignment to the course has been properly cancelled. The grade shall indicate the student's achievement with respect to the objectives of the course.

For credit courses:

A—highest passing grade.

B

C

D—lowest passing grade; passing minimal objectives of the course.

E—conditional failure; failure to achieve minimal objectives, but only to such limited extent that credit can be obtained by examination or otherwise without repeating the entire course. This grade represents failure in the course unless and until the record is duly changed within one semester. It cannot be changed to a grade higher than a D.

F—failure to achieve minimal objectives of the course. The student must repeat the course satisfactorily in order to establish credit in it.

For zero credit courses (including thesis research but not including laboratory portions of courses in which, for purposes of scheduling, separate course designations and separate class cards are used for the laboratory sections):

S—satisfactory; meets course objectives.

U—unsatisfactory; does not meet course objectives.

For incomplete work, either credit or noncredit:

O—incomplete; no grade; a temporary record of work which was interrupted by unavoidable absence or other causes beyond a student's control, and which work was passing at the time it was interrupted. An instructor may require the student to secure the recommendation of the dean of men or the dean of women that the circumstances warrant a grade of incomplete. On the record a grade of O will be equivalent to a W unless and until the record is duly changed within one semester.

Directed grades. The registrar is directed to record the following grades and symbols under special circumstances:

W—withdrew; a record of the fact that a student was enrolled in a course and withdrew or cancelled the course after the last date for late registration and adding courses.

WF—withdrew failing; a record of course cancellation after the last date for cancelling a course without grade, at which time, according to a statement from the instructor, the student was not passing in his work. This grade counts in all respects as a failing grade.

A grade of WF may be directed by the dean of men, the dean of women, or the Committee on Scholastic Delinquency and Readmission when a student is dropped from a course for serious scholastic delinquency.

GOOD STANDING

For purposes of reports and communications to other institutions and agencies and in the absence of any further qualification of the term, a student shall be considered in good standing unless he has been dismissed, suspended, or dropped from the University and has not been readmitted.

Scholarship Indexes and Probation Standards

SCHOLARSHIP INDEXES

The scholastic standing of all regular students enrolled in programs leading to an undergraduate degree shall be determined by two scholarship indexes, the Semester Index and the Graduation Index.

- (a) The Semester Index is an average determined by weighting each grade received during a given semester by the number of semester hours of credit in the course.
- (b) The Graduation Index is a weighted average of all grades received by a student while in the curriculum in which he is enrolled plus all other grades received in courses taken in other curricula offered by the University and properly accepted for satisfying the requirements of the curriculum of the school in which the student is enrolled. With the consent of his adviser, a student may repeat a course. In the case of courses which have been repeated or in which conditional grades have been removed by examination or for which a substantially equivalent course has been substituted, the most recent grade received shall be used.
- (c) For the purpose of averaging, each grade shall be weighted in the following manner:
 - A—6 x semester hours = index points
 - B—5 x semester hours = index points
 - C—4 x semester hours = index points
 - D—3 x semester hours = index points
 - E, F, WF 2 x semester hours = index points
 - O, W not included

GRADUATION INDEX REQUIREMENTS

For the bachelor's degree: A minimum Graduation Index of 4.00 shall be required for graduation on and after September 1, 1965.

For the associate degree: A minimum Graduation Index of 3.90 shall be required for graduation on and after September 1, 1965.

SCHOLASTIC PROBATION

A candidate for the bachelor's or associate degree shall be placed on probation if his semester or graduation index at the end of any semester is less than that required for a student with his classification as shown in Table A. A student on probation shall be removed from that status at the end of the first subsequent semester in which he achieves semester and graduation indexes equal to or greater than those required for a student with his classification as shown in Table A. Any grade change due to a reporting error will require reconsideration of probation status.

Temporary students who do not achieve academic standing required of regular students may be discontinued. Probation is concerned only with the regular semesters and not with the summer sessions, summer camps, and intensive courses.

TABLE A. INDEX LEVELS FOR PROBATION
S = Semester Index; G = Graduation Index

Year	Sept. 1, 1964 to Aug. 31, 1965		Sept. 1, 1965 and after	
	S	G	S	G
1	3.5	3.5	3.5	3.5
2	3.5	3.5	3.5	3.5
3	3.6	3.75	3.6	3.75
4	3.6	3.85	3.6	3.90
5	3.7	3.90	3.7	3.95
6	3.7	3.95	3.7	4.0
7	3.7	3.95	3.7	4.0
8 and up	3.7	3.95	3.7	4.0

DROPPING OF STUDENTS FOR SCHOLASTIC DEFICIENCY

A student on scholastic probation shall be dropped from the University if at the close of any semester the semester or graduation index is less than that required of a student with his classification as shown in Table B. This rule shall not apply for the semester in which the student completes all requirements for his degree.

TABLE B. INDEX LEVELS FOR DROPPING
S = Semester Index; G = Graduation Index

Year	Sept. 1, 1964 to Aug. 31, 1965		Sept. 1, 1965 and after	
	S	G	S	G
1*	3.2	3.2	3.2	3.2
2	3.3	3.3	3.3	3.3
3	3.4	3.5	3.4	3.5
4	3.4	3.6	3.4	3.6
5	3.5	3.7	3.5	3.7
6	3.5	3.75	3.5	3.8
7	3.5	3.80	3.5	3.85
8 and up	3.5	3.85	3.5	3.9

* Affects only students entering on probation.

DISTINGUISHED STUDENTS

Regular undergraduate students, carrying at least 14 semester hours, who successfully complete all their courses with a grade C or higher and obtain a semester scholarship index of 5.50 or better will be designated as distinguished for that semester.

DEGREES WITH DISTINCTION

Degrees are awarded at the end of each semester and summer session to candidates who have completed the requirements of their schools. At each of these periods degrees with distinction are awarded to those completing the undergraduate plans of study under the following rules:

(a) Distinction at graduation shall be awarded on the basis of all course work taken. Baccalaureate degrees with distinction shall be granted only to those who complete the four (or five) year curricula at Purdue and not to those who complete only the first three years at Purdue.

(b) A candidate for the baccalaureate degree with distinction must have earned at least 70 hours of credit at Purdue. A candidate for an associate degree with distinction must have earned at least 45 hours of credit at Purdue.

For any student to qualify for distinction, his scholarship index for all work completed must be at least 5.00.

(c) If the number of graduates in any school who qualify for distinction under rules (a) and (b) exceeds one-tenth of the total number of graduates from that school and for that semester or summer session, the number of degrees with distinction shall be limited to one-tenth of the class in that school, and those graduates with highest indexes shall be included. In administering this rule all baccalaureate engineering graduates will be considered as one school and all associate degree graduates will be considered as one school.

(d) Of those students who qualify for distinction under these rules, the three-tenths of the baccalaureate graduates having the highest indexes shall be designated as graduating with highest distinction, irrespective of the schools to which they may belong. The three-tenths of the associate degree graduates having the highest indexes will be designated as graduating with highest distinction.

(e) No student with a record of faculty discipline shall be included without special approval by the faculty.

RECOGNITION OF HIGH SCHOLASTIC ATTAINMENT

A faculty committee is charged with the duty of recognizing students of superior ability and of assisting such students to receive the greatest possible benefits from their college careers.

High scholastic attainment is recognized by citation for distinguished scholarship. Those placed on the list of distinguished students, published after the close of each semester, are entitled to special privileges as follows:

Honor students of all classes are offered the opportunity to do work, for credit toward graduation, in addition to their regular schedule of studies. These additional assignments must have the approval of the head of the school involved. In order to make such additional work practicable the following special concessions may be granted:

1. Regular assignment of such additional subjects as the schedule will permit.
2. Assignments outside class under the supervision of an instructor.
3. Opportunities to gain credit in a subject by special examination.

4. Special arrangements as approved by the head of the school involved.
5. Some flexibility in the application of the system of prerequisites to these students.

Detailed reports of special arrangements under numbers 2 and 4 above are to be filed by the instructor with the dean of the school involved, with a recommendation concerning the amount of credit to be granted.

Students who in the judgment of one or more faculty members merit citation for special distinguished achievement shall have their names presented through the heads of instructional departments or directly to the Committee on Students of Superior Ability, together with such evidence of achievement as is available. The criteria for selecting students in this group are: (a) original thinking of consistently good quality; (b) achievement other than class work—publication of literary, artistic, or scientific work; (c) work which requires great ingenuity or industry, but which may not lead to definite publication; and (d) independent projects of reasonable magnitude carried out by the student on his own initiative.

Projects carried out by such students may receive special achievement credit. Students in this group are not eligible for the special privileges listed above for distinguished students.

Plans of Study

ABBREVIATIONS

A&D—Art and Design	EG—Engineering	MA—Mathematics
AGR—Agriculture	Graphics	ME—Mechanical Engi-
AGRY—Agronomy	ENGL—English	neering
ART—Architectural	ENGR—Engineering	PEMN—Physical Educa-
Engineering	ESC—Engineering Sci-	tion for Men
Technology	ences	PEW—Physical Educa-
BIOL—Biological Sciences	ET—Electrical Engineer-	tion for Women
CHE—Chemical Engi-	ing Technology	PHAR—Pharmacy
neering	FOR—Forestry and Con-	PHCH—Pharmaceutical
CHM—Chemistry	servation	Chemistry
CM—Chemical and Met-	FR—French	PHIL—Philosophy
allurgical Engineer-	GER—German	PHYS—Physics
ing Technology	GNT—General Studies,	POL—Political Science
CS—Computer Science	Technology	PST—Physical Sciences,
CT—Civil Engineering	GS—General Studies	Technology
Technology	HIST—History	PSY—Psychology
DM—Mechanical Engi-	INDM—Industrial Man-	RUSS—Russian
neering Technology	agement	SOC—Sociology
ECON—Economics	IT—Industrial Engineer-	SPAN—Spanish
ED—Education	neering Technology	SPE—Speech
EE—Electrical Engineer-		STAT—Statistics
ing		

Schools of Engineering

Undergraduate instruction in aeronautical engineering, agricultural engineering, chemical engineering, civil engineering, electrical engineering, engineering sciences, industrial engineering, mechanical engineering, and metallurgical engineering leads to the degree of Bachelor of Science. In order to give the student sufficient time to adjust himself and to choose the branch of engineering for which he is best adapted, the following program of study during the freshman year is common for all engineering curricula. Only those students with adequate background training will be expected to accomplish this in two semesters. Students with inadequate preparation, particularly in mathematics and chemistry, may require an additional semester or summer session to attain sophomore standing. Sophomore plans of study available in some of the fields of engineering are indicated.

GENERAL EDUCATION PROGRAM

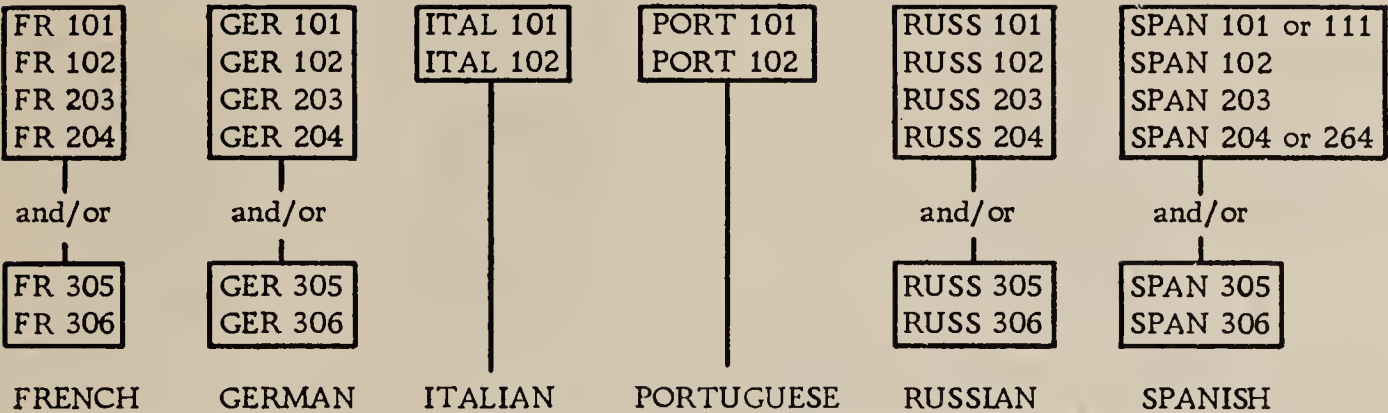
Most engineering students are required to take a minimum of 24 credit hours of general education courses. Six of these credit hours are specified: three hours of English and three hours of speech. The balance of the program is selected from among various "sequences" which are listed in the next section.

The sequences are divided into two broad classes: Group I and Group II. Most students take a 12-hour sequence from one of the two classes and a six-hour sequence from the other. In certain cases in which the student has special needs or background, three six-hour sequences or two nine-hour sequences may be used. The student should consult with his academic counselor concerning possible deviations in the sequences.

The general education program consists of ENGL 101 or 103 and SPE 114, plus a six-hour sequence chosen from either Group I or Group II and a 12-hour sequence chosen from the remaining group.

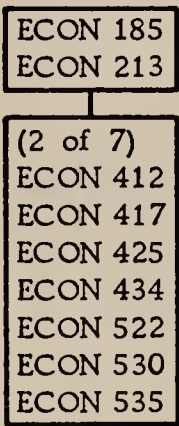
GROUP I

FOREIGN LANGUAGE AND CULTURE (6 or 12 hrs)*



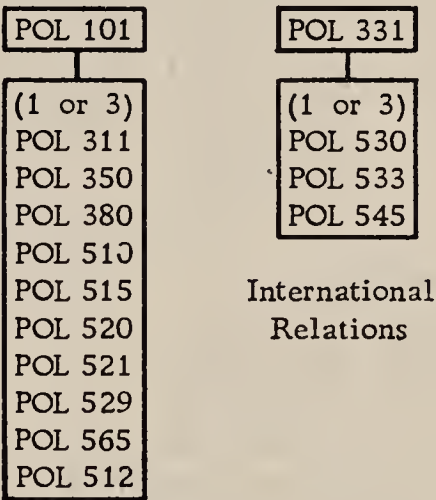
PLUS ANY ADVANCED LITERATURE COURSE IN A GIVEN LANGUAGE SEQUENCE

ECONOMICS (6 or 12 hrs)



Economics

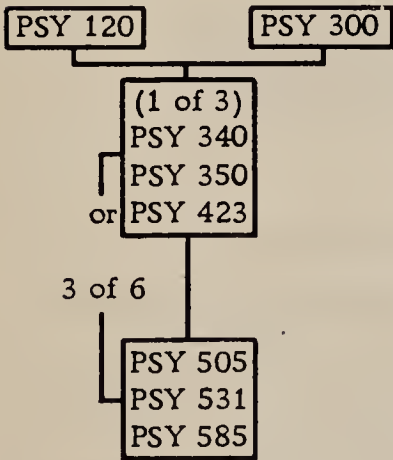
POLITICAL SCIENCE (6 or 12 hrs)



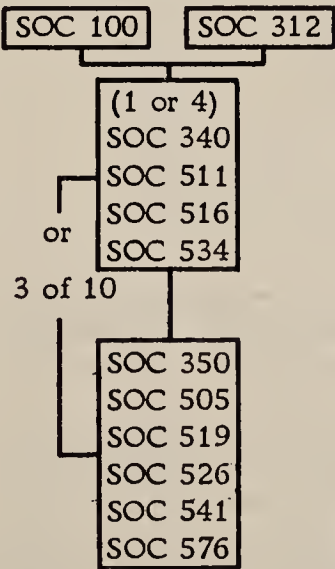
American Government

International Relations

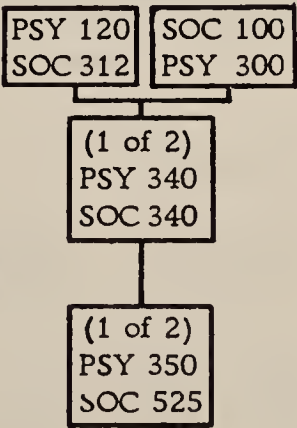
PSYCHOLOGY (6 or 12 hrs)



SOCIOLOGY (6 or 12 hrs)



PSYCHOLOGY AND SOCIOLOGY † (6 or 12 hrs)

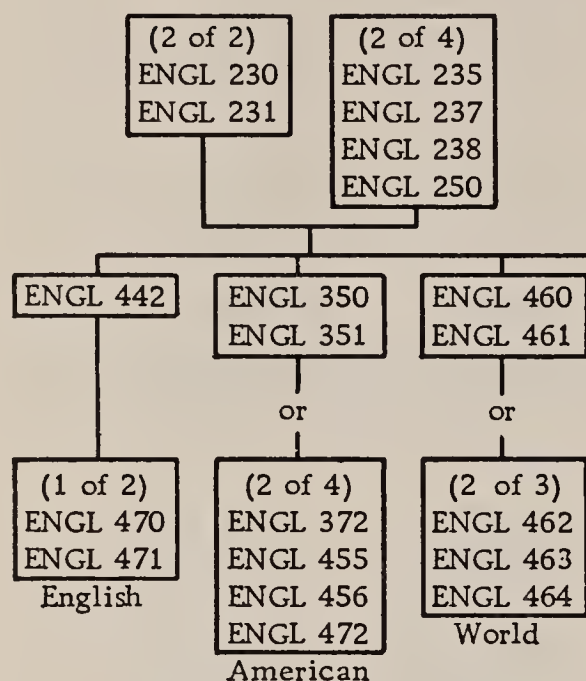


* The first course taken in the language sequence is determined by a placement examination.

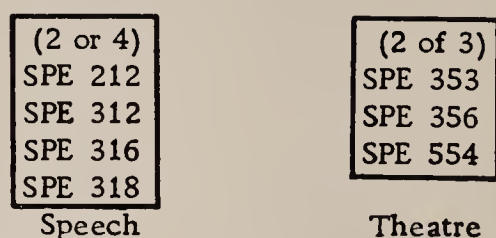
† Freshman and sophomore students can elect SOC 100 or PSY 120 but not SOC 312 or PSY 300. Juniors and seniors can elect SOC 312 or PSY 300 but not SOC 100 or PSY 120. SOC 340 and PSY 340 cover the same subject matter.

GROUP II

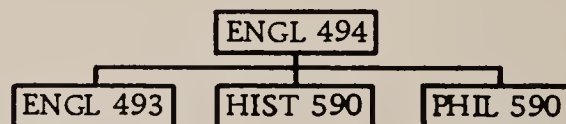
LITERATURE (6 or 12 hrs)*



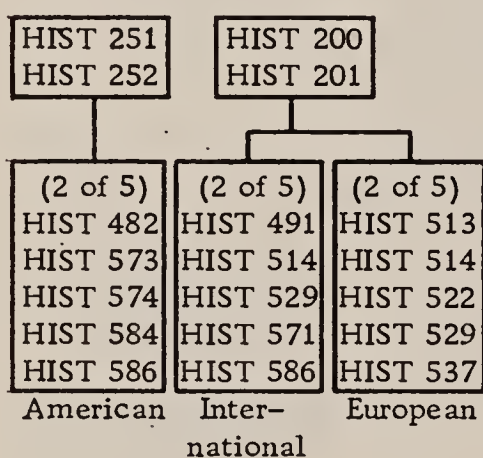
SPEECH and/or THEATRE (6 or 12 hrs)†



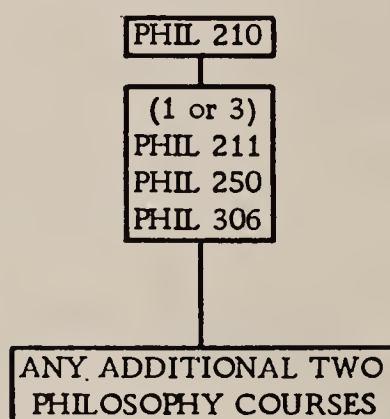
INDEPENDENT READING (6 or 12 hrs)



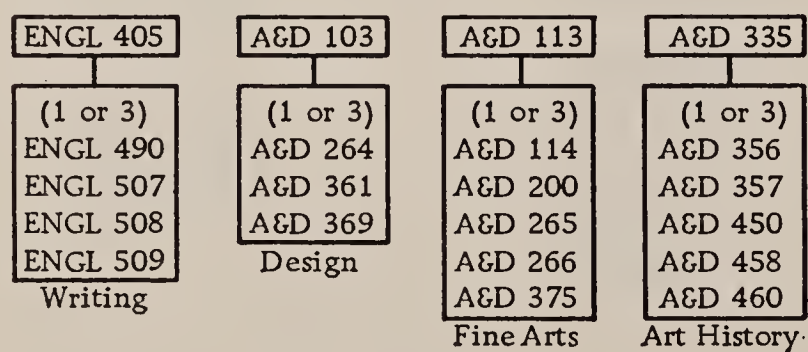
HISTORY (6 or 12 hrs)



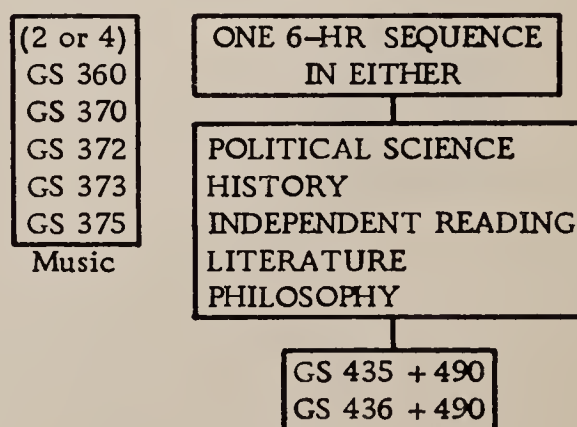
PHILOSOPHY (6 or 12 hrs)



CREATIVE ARTS (6 or 12 hrs)



GENERAL STUDIES (12 hrs)



* Students wishing to substitute 500-level courses in the literature sequence should consult with the instructor of the course involved.

† Six hours of speech and six hours of theatre can be combined into a 12-hour sequence.

FRESHMAN ENGINEERING

Program A: Students fully qualified upon entrance.

First Semester		Second Semester	
Course Name	Credit Hrs.	Course Name	Credit Hrs.
CHM 115	4	CHM 116	4
MA 161	5	MA 162	5
SPE 114 or ENGL 101	3	ENGL 101 or SPE 114	3
ENGR 100	1	PHYS 152	4
EG 118	3	General Elective	3
General Elective	3		
	<hr/> 19		<hr/> 19

Program B: Students with below average preparation in mathematics.

Course Name	Credit Hrs.	Course Name	Credit Hrs.
CHM 115	4	CHM 116	4
MA 151	5	MA 161	5
ENGL 101 or SPE 114	3	SPE 114 or ENGL 101	3
ENGR 100	1	General Elective	6
EG 118	3		
	<hr/> 16		<hr/> 18

Program C: Students with below average preparation in chemistry.

Course Name	Credit Hrs.	Course Name	Credit Hrs.
CHM 100	3	CHM 115	4
MA 161	5	MA 162	5
SPE 114 or ENGL 101	3	ENGL 101 or SPE 114	3
ENGR 100	1	PHYS 152	4
EG 118	3	General Elective	3
General Elective	3		
	<hr/> 18		<hr/> 19

Program D: Students with below average preparation in chemistry and mathematics.

Course Name	Credit Hrs.	Course Name	Credit Hrs.
CHM 100	3	CHM 115	4
MA 151	5	MA 161	5
ENGL 101 or SPE 114	3	SPE 114 or ENGL 101	3
ENGR 100	1	General Elective	6
EG 118	3		
	<hr/> 15		<hr/> 18

School of Technology

ASSOCIATE DEGREE PROGRAMS

The University has a number of two-year undergraduate programs leading to the Degree of Associate in Applied Science. The work offered in these programs is of University grade as are all undergraduate courses, but the offerings are much more applied in nature.

Curricula in this field are offered by a variety of institutions, and cover a considerable range as to duration and content of subject matter, but have in common the following purposes and characteristics:

- (1) The purpose is to prepare individuals for various technical positions or lines of activity encompassed within the field of engineering, but the scope of the programs is more limited than that required to prepare a person for a career as a professional engineer.
- (2) Programs of instruction are essentially technological in nature, based upon principles of science and include sufficient post-secondary school mathematics to provide the tools to accomplish the technical objectives of the curricula.
- (3) Emphasis is placed upon the use of rational processes in the principal fundamental portions of the curricula that fulfill the stated objectives and purposes.
- (4) Programs of instruction are briefer and usually more completely technical in content than professional curricula, though they are concerned with the same general fields of industry and engineering. They do not lead to the baccalaureate degree in engineering.
- (5) Training for artisanship is not included within the scope of education of technical institute type.

ARCHITECTURAL ENGINEERING TECHNOLOGY

This curriculum is designed to prepare students for technological employment with contractors, building materials suppliers, architects, civil engineers, and related governmental agencies.

Emphasis is placed on construction materials and processes, specifications, regulations, estimating, surveying, frame and masonry construction, and architectural and structural drafting, as well as on related courses in mathematics and physical science.

Also included are courses dealing with some of the historical, economic, and human relations aspects related to the individual in our American industrial life.

Graduates are prepared to accept positions as estimators, expeditors, planning technicians, field inspectors, architectural detailers, architectural draftsmen, and sales representatives. With experience, after completing this program of study, graduates are now holding positions as field engineers, technical engineers, junior structural engineers, engineering assistants, shop superintendents, and real estate brokers. This field of specialization is well designed to help the student who is interested in going into the construction business for himself.

FRESHMAN YEAR*

First Semester				Second Semester			
Course No.			Credit	Course No.			Credit
ART	116	Architectural Draw-		ART	156	Frame Construction .	3
		ing	2	ART	164	Building Materials .	3
ENGL	101	English Composi-		DM	212	Mechanics of	
		tion	3			Materials	4
MA	153	Algebra and Trigo-		EG	113	Slide Rules and	
		nometry	3			Graphs	1
PST	136	Physics: Mechanics		MA	154	Algebra and Trigo-	
		and Heat	4			nometry II	3
PSY	120	Psychology	3	PST	176	Physics: Electricity,	
or		Introductory Sociol-				Sound, and Light..	4
SOC	100	ogy	3				
ART	172	Systems of Construc-					18
		tion	2				
			17				

INDUSTRIAL ENGINEERING TECHNOLOGY

This major field of specialization is designed to prepare students primarily for technological services in the industrial engineering areas of production planning and control, plant layout, quality control, job evaluation, and cost analysis. It also covers the essentials of management with which foremen, supervisors, and administrative personnel in general are concerned.

Typical jobs are time-study man, methods planner, production control clerk, stock supervisor, cost analyst, job analyst, and personnel interviewer.

Emphasis is placed upon courses in motion and time study, job evaluation, wage incentives, production and operation planning, plant layout, and industrial safety, and on courses in mathematics, physics, and chemistry.

Also included are courses dealing with some of the historical, economic and human relations aspects of our American industrial life, all related to the individual.

FRESHMAN YEAR

First Semester				Second Semester			
Course No.			Credit	Course No.			Credit
EG	110	Drafting Funda-		ENGL	101	English Composition	3
		mentals	3	IT	120	Systems and	
IT	104	Industrial Organi-				Procedures	3
		zation and		IT	262	Motion Study and	
		Management	4			Work Methods	3
IT	110	Electronic Data		PSY	370	Psychology and Bus-	
		Processing	3			iness and Industry..	3
MA	151	Elementary Mathe-		EG	113	Slide Rules and	
		matics for Engineer-				Graphs	1
		ing and the Physical		PST	176	Physics: Electricity,	
		Sciences	5			Sound, and Light... 4	
PST	136	Physics: Mechanics					17
		and Heat	4				
			19				

* Sophomore year available at the Calumet Campus.

SOPHOMORE YEAR

First Semester			Second Semester		
IT	200	Computer Program- ming Fundamentals. 3	IT	212	Industrial Safety ... 2
ECON	210	Principles of Economics 3	IT	224	Production Planning and Control 4
IT	152	Human Relations in Industry 3	IT	250	Fundamentals of Production Cost Analysis 3
IT	204	Techniques of Main- taining Quality 3	GNT	220	Technical Report Writing 3
IT	266	Work Measurement and Incentives 3	MA	224	Introductory Analysis II 3 or Elective (3)
MA	223	Introductory Analysis I 3 or Elective (3)	SPE	114	Principles of Speech 3
					18

ELECTIVES

GNT	268	Elements of Law 3
ET	106	Introduction to Computer Fundamentals 3
IT	208	Integrated Systems Analysis..... 3
IT	268	Plant Layout 3
IT	272	Job Evaluation 2
IT	296	Industrial Engineering Case Problems..... 2
IT	312	Materials Handling 3
IT	368	Legislation Affecting Industrial Relations..... 4
PST	284	Instrumentation 3
STAT	351	Elementary Statistics I 3
STAT	352	Elementary Statistics II 3

MECHANICAL ENGINEERING TECHNOLOGY

This program of study has been designed to prepare students to take employment in industries requiring services of drafting and design of a mechanical nature.

Emphasis is placed on product and tool design, mechanical maintenance, testing, inspection, and the selection of methods for efficient and economical production.

Also included are courses dealing with fundamentals of industrial management and with some of the historical, economic, and human relations aspects of our American industrial life, all related to the individual.

Graduates of this program accept jobs as laboratory technicians, engineering assistants, detailers, draftsmen, tool maintenance men, plant maintenance men, layout men, inspectors, and machine and tool salesmen. With additional experience students may aspire to positions as industrial supervisors, machine and tool designers, tool buyers, production expeditors, and cost estimators.

FRESHMAN YEAR*					
First Semester			Second Semester		
Course No.		Credit	Course No.		Credit
EG	110	Drafting Fundamentals	DM	156	Graphical Computations
		3			3
DM	180	Materials and Processes	DM	204	Production Drawing.
		3	DM	212	Mechanics of Materials
ENGL	101	English Composition I			4
		3	MA	154	Algebra and Trigonometry II
MA	153	Algebra and Trigonometry I			3
		3	PST	176	Physics: Electricity, Heat, Sound
PST	136	Physics: Mechanics and Heat			4
		4	EG	113	Slide Rules and Graphs
SOC	100	Introductory Sociology			1
		3			
or					
PSY	120	Elementary Psychology			
		3			
		<hr/>			<hr/>
		19			18

CERTIFICATE PROGRAMS IN APPLIED TECHNOLOGY

The certificate programs are designed primarily for the more mature part-time student through consultation with leaders from business and industry. Each program is actively reviewed in the light of the latest trends in manufacturing and plant and business operations.

These are intensive and practical programs of less than 40 semester hours of credit. Advancement in each of these programs can be varied to suit the needs of the individual student who may take one, two, or three courses each semester. The average part-time student can complete any one of the programs within three years.

Enrollment is on the basis of a program carefully tailored to meet individual student needs and vocational objectives through consultation with an experienced counselor. Changes in the student's program arising out of new work assignments or changes in vocational objective may be worked out with his counselor.

In those engineering technology areas which have a counterpart in the two-year curricula, a student may work toward the certificate and then toward the associate degree, provided he has been admitted as a regular student.

ARCHITECTURAL DRAFTING CERTIFICATE PROGRAM

This is the counterpart of the Architectural Engineering Technology program. It is an intensive and practical program of 36 semester hours credit designed to prepare part-time students for technological employment with architects or to aid beginning employees in quickly developing greater competence in this field.

In the earlier courses, emphasis is placed on the fundamentals of architectural drafting as commonly utilized in architecture. After competence in the fundamental techniques is established, the emphasis shifts to fundamental

* Sophomore year available at the Calumet Campus.

knowledge of materials and practices in modern architecture and to general knowledge required of architects' assistants.

Course No.			Credits
MA	153	Algebra and Trigonometry I	3
ART	116	Architectural Drawing	2
ART	164	Building Materials	3
MA	154	Algebra and Trigonometry II	3
PST	136	Physics: Mechanics and Heat	4
ART	156	Frame Construction	3
ART	276	Specifications and Contract Documents	2
ART	236	Architectural Projections	2
ART	220	Concrete and Masonry Construction	3
DM	212	Mechanics of Materials	4
ART	172	Systems of Construction	2
ART	256	Structural Drafting	3
ART	204	Building Regulations	2
			<hr/> 36

MACHINE DESIGN

This is the counterpart of the Mechanical Engineering Technology program and is an intensive and practical program of 38 semester hours. It is designed to train part-time students in the fundamentals of industrial drafting and to work progressively into the principles of mechanical design.

It prepares and assists technical employees to work in drafting techniques associated with general product design or as mechanical engineering assistants.

Course No.			Credits
EG	110	Drafting Fundamentals	3
MA	153	Algebra and Trigonometry I	3
DM	156	Graphical Computation	3
MA	154	Algebra and Trigonometry II	3
DM	180	Materials and Processes	3
PST	136	Physics: Mechanics and Heat	4
DM	204	Production Drawing	3
DM	212	Mechanics of Materials	4
DM	228	Machine Design I	3
DM	264	Machine Design II	3
DM	216	Machine Elements	3
DM	232	Dynamics and Mechanisms	3
			<hr/> 38

INDUSTRIAL AND LABOR RELATIONS

Training in industrial and labor relations is essential for those engaged in the field of employment relationship. Sound employee-employer relations prevail only where representatives of both sides, labor and management, are adequately trained and experienced. The two-year day and evening course of study provides labor relations assistants and union officers with professional education needed to handle the basic problems that arise in industry and labor. The program consists of 29 credits.

Required Courses			Credits
GNT	240	Labor Relations Problems	3
GNT	268	Elements of Law	3
IT	104	Industrial Organization and Production	4
Recommended Courses			
ENGL	101	English Composition	3
PSY	120	Psychology	3
*GNT	204	Fundamentals of Practical Speaking	2
GNT	260	Economics of Industry	2
GNT	264	Conference Speaking	2
IT	152	Human Relations in Industry	3
IT	368	Legislation Affecting Industrial Relations....	4
Optional Courses			
IT	260	Motion and Time Study	3
IT	272	Job Evaluation	2
IT	280	Wage Incentives	2

PROFESSIONAL FOREMANSHIP PROGRAM

The Professional Foremanship certificate program is an intensive and practical curriculum equivalent to 37 semester hours. It is intended to provide foremen with the professional education needed to handle the many supervisory and technical problems which they meet daily in technical, communications, and human relations fields.

The program has been set up by representatives of industry, professional foremen's organizations, and the University. It is designed to meet the needs of management, concerned with training foremen for positions of leadership.

The Professional Foremanship program is the certificate program counterpart of the Industrial Engineering Technology two-year curriculum. Enrollment is on the basis of a program worked out with the counselor assigned and carefully tailored to individual needs.

Students admitted in the temporary classification may qualify for the certificate in Professional Foremanship by taking approved undergraduate level, lower division technology courses for which their admission classification establishes eligibility and for which they have necessary prerequisites. Appropriate credits earned in this program while in the temporary student classification may be used for credit toward an associate degree under rules governing reclassification as a regular student.

Required Courses—11 semester hours minimum

Course No.		Credits	Credits
IT	104 Industrial Organization and Production...	4	4
PSY	120 Psychology OR	3	—
GNT	120 Psychology	—	2
IT	152 Human Relations in Industry	3	3
SPE	114 Principles of Speech OR	3	—
GNT	204 Fundamentals of Practical Speaking	—	2
		13	11

* Students may substitute: SP 114 Speech (3).

Optional Courses—14 semester hours maximum chosen from one or a combination of the following groups:

Group I—14 semester hours maximum

Communications—10 semester hours maximum
 English and Report Writing—7 hours maximum
 Advanced courses in Speech—3 hours maximum
 Economics and Labor Relations—6 hours maximum
 Physical Sciences—12 hours maximum

Group II—8 semester hours maximum

Courses specific to two-year diploma curricula—8 semester hours maximum
 Courses from one or more technologies may be elected in this group provided that (1) they relate directly to the individual's duties, responsibilities, or line of promotability; and (2) prior approval of the counselor and the head of the Department of Engineering Technology is obtained.

MANAGEMENT EXPERIENCE—(Equivalent to 12 semester hours)

Before receiving the Professional Foremanship Certificate, the candidate must have had two years of successful experience in the management field. Satisfaction of this requirement is met by a confirming letter from the managerial employer under whom the candidate worked. Formal credit is not established for this work, but it is considered equivalent to 12 semester hours of credit in the Professional Foremanship program.

TOOL DESIGN

This is the counterpart of the Mechanical Engineering Technology program. It is an intensive and practical program of 35 semester hours designed to train part-time students in the fundamentals of industrial drafting and to advance them progressively into the principles of design as applied to industrial production tools and machines.

Course No.		Credits
EG 110	Drafting Fundamentals	3
MA 153	Algebra and Trigonometry I	3
DM 156	Graphical Computations	3
MA 154	Algebra and Trigonometry II	3
DM 204	Production Drawing	3
PST 136	Physics: Mechanics and Heat	4
DM 212	Mechanics of Materials	4
DM 236	Jig and Fixture Design	3
DM 288	Die Design	3
DM 216	Machine Elements	3
DM 232	Dynamics and Mechanisms	3

DEPARTMENT OF INDUSTRIAL EDUCATION

Four-year plans of study in this area lead to the degree of Bachelor of Science in Industrial Education. The department offers five options toward the bachelor's degree.

Following are the core requirements for all students in industrial education. Details of the programs offered and of courses required beyond the core subjects are found in the School of Technology catalog.

The core requirements are:

ED 260 or IED 260	3 hours
English Composition (ENGL 101, 102).....	6 hours
Developmental Reading (ENGL 185).....	1 hour
Grammar and Usage (ENGL 425)	3 hours
Speech (SPE 114)	3 hours
Psychology (PSY 120, ED 285).....	6 hours
Philosophy (PHIL 210)	3 hours
Social Sciences (HIST 252, POL 101, ECON 210, SOC 100).....	12 hours
Mathematics (153 and 154 or 123 and 124).....	6 hours
Chemistry (CHM 113, 114).....	6 hours
Physics (PHYS 220, 221).....	8 hours
Technical and Applied Arts (TAA 115, 117, 215, 212).....	8 hours
Drafting (EG 114, 115).....	4 hours

School of Humanities, Social Science, and Education

Three bachelor's degrees are offered in the School of Humanities, Social Science, and Education: Bachelor of Arts, Bachelor of Science, and Bachelor of Physical Education. All programs leading to these four degrees have certain requirements in common:

- A. Satisfaction of the general University requirements in military training and physical education;
- B. Satisfaction of the minimum scholastic index requirements as established by the faculty;
- C. The general University requirements for residence, payment of diploma fee, attendance at commencement exercises, etc. For further details about these requirements, see the *General Information Bulletin*.

Bachelor of Arts and Bachelor of Science

The program leading to the degree Bachelor of Science is followed by students majoring in audiology and speech sciences, or psychology. The program leading to the degree Bachelor of Arts is followed by students majoring in any of the fields of humanities or social sciences, in high school teaching in any of these fields, or by women students preparing to teach physical education.

In addition to the University-wide requirements for the bachelor's degree (military training, physical education, minimum scholastic index as established by the faculty, etc.), the requirements for the Bachelor of Arts and Bachelor of Science degrees are:

- A. Completion of the required courses listed under General Education Requirements which are designed to insure the broad liberal education of the student;
- B. Selection of an area of concentration, or of a major and a minor, and the completion of the requirements on file in the office of the dean;
- C. Completion of at least 126 semester hours of credit within ten years preceding the date of graduation.

GENERAL EDUCATION REQUIREMENTS

About one half of the total program is devoted to the satisfaction of the "core requirements," which have been chosen with a view to broadening each student's background. These requirements for the B.A. and B.S. degrees are:

English Composition (ENGL 101 and 102, or 103 or equivalent).....	6 hours
Speech (SPE 116)	3 hours
Foreign Language (courses numbered 101, 102, 203, 204; or proficiency in 204 or higher in one modern foreign language).....	12 hours
Literature (any six hours for which student is qualified, in English, or in a foreign language)	6 hours
Mathematics (MA 123, 124; or 133, 134; or 153, 154).....	6 hours
Natural or Physical Science (a six-hour laboratory sequence in physics, chemistry, or biology)	6 hours
Social and Behavioral Sciences	
(a) history (HIST 200 or 251).....	3 hours
(b) sociology or psychology (SOC 100 or PSY 120).....	3 hours
(c) political science or economics (POL 101 or ECON 210).....	3 hours
(d) two additional courses of three hours each from any two of the above five subjects.....	6 hours
Philosophy (PHIL 210, 211, or 250).....	3 hours
Art, Music, Theatre (A&D 355, 356, 357; SPE 240, 250, 353, 356; GS 370, 372, 373, 375).....	3 hours
General Studies (GS 435 or 436)	2 hours
	—
	62 hours

Areas of Concentration

Before the end of his third semester, each student will select (1) an area of concentration or (2) a major and a minor. The area, or the major and minor, provides the concentration necessary for admission to a graduate school, for a teaching certificate, or for a general and well-rounded education.

An area program will require from 33 to 40 semester hours beyond the general education requirements. A major will require about 24 semester hours and a minor about 12. The requirements of the concentration area selected by the student become requirements for his graduation.

Each student must file his choice of area of concentration or major and minor at the office of the dean not later than the end of the third semester on

forms available at that office. No student will be permitted to register as a junior unless his concentration choice has been filed. The choice of area of major and minor may be changed subsequently by the student, with permission of the dean. The following areas, majors, minors, and teaching majors are available:

Areas

American Civilization	French
American Government and Politics	German
American Literature	International Relations
Art and Design	Radio
Creative Writing	Recreation
Deliberative Speech	Russian
Drama	Spanish
English Honors	Speech, General
English Literature	Technical Writing

Majors

American Government and Politics	Interior Design
American History	International Relations
American Literature	Journalism
Commercial Art (Advertising Design)	Philosophy
Creative Writing	Psychology
Drama	Public Address
English Literature	Radio
European History	Recreation
Family and Community Living	Russian
French	Sociology
German	Spanish
Health and Safety	Speech, General

Minors

American Government and Politics	Library Science
Commercial Art	Literature
Economics	Mathematics
French	Philosophy
German	Psychology
Health and Safety	Recreation
History	Russian
Interior Design	Sociology
International Relations	Spanish
Journalism	Speech, General

Teaching Majors

Arts and Crafts	Nursery-Kindergarten Education
Elementary Education	Physical Education and Health (Women)
English Honors	Social Studies
English	Economics
Foreign Language	Government
French	Sociology
German	U.S. History
Russian	World History
Spanish	Speech
Health and Safety	Speech and Hearing Therapy

Plans of Study

Each student's program for the four years will be based on one of several plans of study, appropriately modified to fit his concentration requirements and his exemptions, i.e., proficiency in modern language, ENGL 103, etc.

Students who plan to teach in high school will use the plan of study for the major subject-matter field, or comprehensive areas, of the teaching certificate for which they expect to qualify.

BACHELOR OF ARTS—GENERAL PROGRAM

FRESHMAN YEAR

First Semester	Second Semester
(4) BIOL 108 (Introduction to Botany)	(4) BIOL 109 (Introduction to Zoology)
(3) ENGL 101 (English Composition I)	(3) SPE 114 (Principles of Speech)
(3) MA 123 (Foundations of Mathematics I)	(3) MA 124 (Foundations of Mathematics II)
(3) Modern Language	(3) Modern Language
(3) Social Science	(3) Social Science
(2-3) Elective or Physical Education	(1) ENGL 185 (Developmental Reading)
	(1-3) Elective or Physical Education
<hr/> (18-19)	<hr/> (18-20)

SOPHOMORE YEAR

First Semester	Second Semester
(3) ENGL 240 (English Literature)	(3) ENGL 241 (English Literature)
(3) Social Science	(3) Social Science
(3) Modern Language	(3) Modern Language
(3) Physical Science	(3) Physical Science
(3) PSY 120 (Elementary Psychology)	(3) ENGL 102 (English Composition II)
(1) Physical Education	(1) Physical Education
<hr/> (16)	<hr/> (16)

ELEMENTARY EDUCATION

Preparation in elementary education is offered to a limited number of students chosen on the basis of above-average scholarship, leadership qualities, good mental and physical health, and positive attitudes toward children and teaching as a profession. In addition to the core program of all students and the professional program in elementary education the student will have 24 semester hours for a major in the field of his choice.

FRESHMAN YEAR

First Semester	Second Semester
(3) ENGL 101 or 103 (English Composition)	(3) POL 102 (Introduction to Government)
(3) POL 101 (Introduction to Government)	or
or	HIST 252 (The U.S. and Its Place in World Affairs)
HIST 251 (American History to 1865)	(4) MA 134 (Math for Elementary Teachers II)
(4) MA 133 (Math for Elementary Teachers I)	(3) Modern Language
(3) Modern Language	(3) ENGL 102 (English Composition II)
(3) SPE 114 (Principles of Speech)	(1) ENGL 185 (Developmental Reading)
—	(3) PSY 120 (Elementary Psychology)
(16)	(17)

SOPHOMORE YEAR

First Semester	Second Semester
(3) BIOL 205 (Biology for Elementary Teachers)	(3) BIOL 206 (Biology for Elementary Teachers)
(3) ENGL 240 (English Literature)	(3) Aesthetics
(3) SOC 100 (Introductory Sociology)	(3) SOC 220 (Social Problems)
(3) Physical Science	(3) Physical Science
(3) Modern Language	(3) Modern Language
—	(3) Second Major
(15)	(18)

PHYSICAL EDUCATION (WOMEN)

FRESHMAN YEAR

First Semester	Second Semester
(3) ENGL 101 or 103 (English Composition)	(3) ENGL 240 or 241 (English Literature)
(3) SPE 114 (Principles of Speech)	(3) PSY 120 (Elementary Psychology)
(3) MA 123 (Elementary Concepts of Mathematics I)	(3) MA 124 (Elementary Concepts of Mathematics II)
(3) Modern Language	(3) Modern Language
(3) Social Science	(3) Social Science
(2-3) Physical Education or Elective	(1-3) Physical Education or Elective
17-18	16-18

PSYCHOLOGY, OR AUDIOLOGY AND
SPEECH SCIENCES

FRESHMAN YEAR

First Semester	Second Semester
(3) ENGL 101 or 103 (English Com- position)	(3) ENGL 102 (English Composi- tion II)
(3) SPE 114 (Principles of Speech)	(1) ENGL 185 (Developmental Reading)
(3) BIOL 109 (Introduction to Zo- ology)	(3) BIOL 108 (Introduction to Bot- any)
(3) MA 153	(3) MA 154
(3) Social Science	(3) PSY 120 (Elementary Psychol- ogy)
(2-3) Physical Education or Elective	(3) Social Science
-----	(1-3) Physical Education or Elective
(17-18)	-----
	(17-19)

BACHELOR OF PHYSICAL EDUCATION

FRESHMAN YEAR

First Semester	Second Semester
(4) BIOL 109 (Introduction to Zool- ogy)	(4) BIOL 108 (Introduction to Bot- any)
(3) ENGL 101 (English Composition I)	(3) ENGL 102 (English Composition II)
(3) SOC 100 (Introductory Sociology)	(3) SPE 114 (Principles of Speech)
(3) PSY 120 (Elementary Psychology)	(3) SOC 220 (Social Problems)
(3) ENGL 240 (Introduction to Lit- erature)	(3) Social Science
-----	(1) ENGL 185 (Developmental Read- ing)
(16)	-----
	(17)

School of Science

The School of Science consists of the Department of Biological Sciences, the Department of Chemistry, the Department of Physics, and the Division of Mathematical Sciences.

Curricula leading to two degrees, Bachelor of Science and Bachelor of Science in Chemistry, are offered by the School of Science. Specific details of these curricula and the requirements for the degrees are listed in the School of Science catalog.

The School of Science offers training to selected students who wish to prepare themselves to teach in the fields of biology, chemistry, mathematics, physics, or in certain combinations of these fields.

BACHELOR OF SCIENCE DEGREE

General Education Requirements

The following general requirements for the B.S. degree in the School of Science are supplemented by requirements of the department of the student's

major. Particular attention is drawn to modifications allowed in the curricula for prospective high school teachers (as indicated below).

1. A total of 124 semester hours, plus physical education or military science as specified by the University.

2. English composition: ENGL 101 and 102, or ENGL 103 entered by achievement examination and completed with a grade of C or better.

3. Modern foreign language: Pass a fourth-semester college-level course in a modern foreign language, or pass an equivalent proficiency examination. In high school teacher curricula, the student must pass a second-semester college-level course in a modern foreign language or pass a proficiency examination.

4. Humanities, social science, and behavioral sciences: The minimum requirement is 18 hours, but it is strongly recommended that the student take more than a minimal program. Six hours must be chosen from each of two of the following areas:

- a. literature, philosophy
- b. history, political science
- c. economics, sociology, psychology

In addition, a satisfactory two-course sequence must be chosen from one of the above areas.

5. Mathematics: At least 11 hours, except for certain curricula in the biological sciences.

6. Science: Each student must take at least four courses in laboratory science (biology, chemistry, geology, physics) *outside his major area*. It is preferable that he take two-course sequences in each of two sciences; in no case shall he satisfy this requirement by courses drawn from more than two sciences.

**BIOLOGICAL SCIENCES, PREMEDICINE,
DENTISTRY, AND MEDICAL TECHNOLOGY**

FRESHMAN YEAR

First Semester	Second Semester
(4) BIOL 109 (Introduction to Zoology)	(4) BIOL 108 (Introduction to Botany)
(4) CHM 115 (General Chemistry)	(4) CHM 116 (General Chemistry)
(3) ENGL 101 (English Composition I)	(3) SPE 114 (Principles of Speech)
(3) MA 153 (Algebra and Trigonometry I)	(3) MA 154 (Algebra and Trigonometry II)
(3) Modern Language*	(3) Modern Language
(3) Elective	(3) Elective
<hr/>	<hr/>
20	20

* German or Russian is recommended.

CHEMISTRY

FRESHMAN YEAR

First Semester	Second Semester
(4) CHM 115 (General Chemistry)	(4) CHM 116 (General Chemistry)
(3) ENGL 101 (English Composition)	(3) SPE 114 (Principles of Speech)
(3) GER 101 (First Course in German)	(3) GER 102 (Second Course in German)
(5) MA 161 (Mathematics for Engineering and the Physical Sciences I)	(5) MA 162 (Mathematics for Engineering and the Physical Sciences II)
(1-4) Elective or Physical Education	(4) PHYS 152 (Mechanics and Sound)
-----	19
16-19	

MATHEMATICS

FRESHMAN YEAR

First Semester	Second Semester
(5) MA 161 (Mathematics for Engineering and the Physical Sciences I)	(5) MA 162 (Mathematics for Engineering and the Physical Sciences II)
(3) ENGL 101 (English Composition I)	(3) SPE 114 (Principles of Speech)
(3) Modern Language	(3) Modern Language
(4) Science Elective	(4) Science Elective
-----	15
15	

PHYSICS

FRESHMAN YEAR

First Semester	Second Semester
(3) ENGL 101 (English Composition I)	(4) CHM 116 (General Chemistry)
(4) CHM 115 (General Chemistry)	(5) MA 162 (Mathematics for Engineering and the Physical Sciences II)
(5) MA 161 (Mathematics for Engineering and the Physical Sciences I)	(4) PHYS 152 (Mechanics and Sound)
(1) ENGL 185 (Developmental Reading)	(3) Modern Language
(3) Modern Language	-----
-----	16
16	

PREPHARMACY

The Purdue School of Pharmacy and Pharmacal Sciences does not admit students directly from high school. Students wishing to prepare for the profession of pharmacy register in the School of Science for the prepharmacy program and apply for transfer to the School of Pharmacy and Pharmacal Sciences at the end of the freshman year. Application for the transfer should be filed with the dean of the Pharmacy School or with the pharmacy adviser before April 1. Students who, for any reason, do not transfer to the School of Pharmacy and Pharmacal Sciences may apply for transfer to any other school of the University or may remain in the School of Science with a change of educational objective.

FIRST YEAR

First Semester	Second Semester
(3) MA 153 (Algebra and Trigonometry I)	(3) MA 154 (Algebra and Trigonometry II)
(3) CHM 111 (General Chemistry)	(3) CHM 112 (General Chemistry)
(3) ENGL 101 (English Composition)	(3) SPE 114 (Principles of Speech)
(3) SOC 100 (Introductory Sociology)	(3) PSY 120 (Elementary Psychology)
(3) Elective	(1) ENGL 185 (Developmental Reading)
<hr/>	(3) Elective
15	<hr/>
	16

BACHELOR OF SCIENCE IN CHEMISTRY DEGREE

This sample program for the freshman year presupposes placement in CHM 117. For details of general education and chemistry course requirements for this degree, see the catalog of the School of Science.

FRESHMAN YEAR

First Semester	Second Semester
(5) CHM 117	(5) CHM 126
(5) MA 161	(5) MA 162
(3) ENGL 101	(3) ENGL 102
(3) GER 101	(3) GER 102
(2) MILT 110	(2) MILT 120
<hr/>	<hr/>
(18)	(18)

School of Industrial Management

FRESHMAN YEAR

First Semester	Second Semester
(4) CHM 115 (General Chemistry)	(4) CHM 116 (General Chemistry)
(5) MA 151* (Elementary Mathematics I)	(5) MA 152* (Elementary Mathematics II)
(3) ENGL 101 (English Composition I)	(3) SPE 114 (Principles of Speech)
(3) POL 101 (Introduction to Government)	(3) HIST 252 (The United States and Its Place in World Affairs)
(1) ENGL 185 (Developmental Reading)	(2-3) Physical Education or Elective
(2-3) Physical Education or Elective	<hr/>
<hr/>	(17-18)
(18-19)	

School of Agriculture

Plans for study in the School of Agriculture include options in agricultural economics, agricultural business management, agricultural education, agronomy, soil and crop science, animal sciences, dairy manufacturing, entomology, food technology, structural pest control, general agriculture, and horticultural science. Study leads to one of three bachelor's degrees in agriculture, agricultural economics, or forestry.

* Qualified students should take MA 161 and MA 162 in place of MA 151 and 152.

GENERAL AGRICULTURE

FRESHMAN YEAR

First Semester	Second Semester
(4) BIOL 109 (Introduction to Zoology)	(4) BIOL 108 (Introduction to Botany)
(3) CHM 111 (General Chemistry)	(3) CHM 112 (General Chemistry)
(3) ENGL 101 (English Composition I)	(3) SPE 114 (Principles of Speech)
(3) Elective	(3) MA 154 (Algebra and Trigonometry II)
(3) Elective*	(6) Electives
(3) MA 153 (Algebra and Trigonometry I)	19
19	

AGRICULTURAL ENGINEERING

See Freshman Engineering Programs on page 17.

AGRICULTURAL SCIENCE

FRESHMAN YEAR

First Semester	Second Semester
(4) CHM 115 (General Chemistry)	(4) CHM 116 (General Chemistry)
(4) BIOL 109 (Introduction to Zoology)	(4) BIOL 108 (Introduction to Botany)
(3) ENGL 101 (English Composition I)	(3) SPE 114 (Principles of Speech)
(3) MA 153 (Algebra and Trigonometry I)	(3) MA 154 (Algebra and Trigonometry II)
(3) ECON 210 (Principles of Economics)	(3) ENGL 102 (English Composition II)
17	17

BIOCHEMISTRY

FRESHMAN YEAR

First Semester	Second Semester
(4) BIOL 109 (Introduction to Zoology)	(4) BIOL 108 (Introduction to Botany)
(4) CHM 115 (General Chemistry)	(4) CHM 116 (General Chemistry)
(3) MA 153 (Algebra and Trigonometry I)	(3) MA 154 (Algebra and Trigonometry II)
(3) ENGL 101 (English Composition I)	(3) Modern Language
(1) ENGL 185 (Developmental Reading)	(3) SPE 114 (Principles of Speech)
(3) Elective	17
18	

* Dairy manufacturing freshmen may use PSY 120 or SOC 100 as a freshman elective in the first semester and POL 101 or SOC 100 in the second semester.

Freshmen specializing in horticulture may use PSY 120 as a freshman elective in the first semester and POL 101 in the second semester. Freshman in the agricultural economics and the agricultural administration options should elect AGECE 100.

FOOD TECHNOLOGY

FRESHMAN YEAR

First Semester		Second Semester	
(3)	CHM 111 (General Chemistry)	(3)	CHM 112 (General Chemistry)
(4)	BIOL 109 (Introduction to Zool- ogy)	(4)	BIOL 108 (Introduction to Bot- any)
(3)	ENGL 101 (English Composition I)	(3)	SPE 114 (Principles of Speech)
(3)	MA 153	(3)	MA 154
(3)	Elective	(3)	Elective
<hr/>		<hr/>	
16		16	

FORESTRY AND CONSERVATION

FRESHMAN YEAR

Common to all Forestry curricula

First Semester		Second Semester	
(4)	BIOL 108 (Introduction to Bot- any)	(4)	BIOL 109 (Introduction to Zool- ogy)
(3)	CHM 111 (General Chemistry)	(3)	CHM 112 (General Chemistry)
(3)	ENGL 101 (English Composition I)	(3)	ENGL 102 (English Composition II)
(3)	MA 153	(3)	MA 154
(3)	ECON 210 (Principles of Eco- nomics)	(3)	SPE 114 (Principles of Speech)
<hr/>		<hr/>	
(16)		(16)	

PREVETERINARY CURRICULUM

An organized four-semester preveterinary curriculum meeting requirements for admission to the School of Veterinary Science and Medicine is available in the School of Agriculture.

This curriculum also provides a strong program in the biological and physical sciences which may be used as a basis for continued training in the School of Agriculture should the degree Bachelor of Science in Agriculture be desired.

There is opportunity to obtain the degrees of Bachelor of Science in Agriculture and Doctor of Veterinary Medicine within a seven-year program. The Bachelor of Science in Agriculture in the general agriculture option is awarded following successful completion of three years in the School of Agriculture and the first two years in the School of Veterinary Science and Medicine; subsequent successful completion of the second two years in the School of Veterinary Science and Medicine will enable the student to receive the degree of Doctor of Veterinary Medicine. In this program the first two years are the preveterinary curriculum; the third year is in the general agriculture option following which the student must apply to and be admitted to the School of Veterinary Science and Medicine for the remaining four years.

FRESHMAN YEAR

First Semester	Second Semester
(3) ENGL 101 (English Composition I)	(3) ENGL 102 (English Composition II)
(4) CHM 111 (General Chemistry)	(4) CHM 112 (General Chemistry with Qualitative Analysis)
(3) MA 153	(4) BIOL 108 (Introduction to Botany)
(3) Elective	(3) SPE 114
(4) BIOL 109 (Introduction to Zoology)	(3) MA 154
—	—
(17)	(17)

School of Home Economics

The plan of study in home economics is designed to prepare young men and women for professional work in the various areas of the field and at the same time to provide a broad general education which prepares the student to meet the needs for home and community living.

Areas of concentration include art and design, child development (nursery-kindergarten), clothing and textiles, foods and nutrition, food management, foods in business, food research, home economics extension, housing, and vocational home economics teaching.

Students interested in preparation for work in the fields mentioned above should enroll in the curriculum listed below.

FRESHMAN YEAR

First Semester	Second Semester
(3) ENGL 101 or 103 (English Composition)	(3) ENGL 102 (English Composition II)
(3) CHM 111 (General Chemistry)	(3) CHM 112 (General Chemistry)
(3) Mathematics	(3) ENGL 240 (English Literature)
(3) SOC 100 (Introductory Sociology)	(3) PSY 120 (Elementary Psychology)
(3) SPE 114 (Principles of Speech)	(3) ECON 210 (Principles of Economics)
—	(1) ENGL 185 (Developmental Reading)
(15)	(16)

Description of Courses

Courses numbered 1 to 499 are primarily for undergraduate students. Courses numbered 500 to 599 are for undergraduates (usually juniors and seniors) and graduate students. Courses numbered 600 and above are for graduate students.

For each course the first part of the description should be interpreted as follows: first, the official number of the course; second, its special title; and third, the number of class, laboratory, and credit hours.

ARET—ARCHITECTURAL ENGINEERING TECHNOLOGY

116. ARCHITECTURAL DRAWING. Lab. 6, cr. 2.

Introduction to architectural drawing, including use of instruments, lettering, orthographic projection, isometric views, and simple working drawings.

156. FRAME CONSTRUCTION. Class 1, Lab. 6, cr. 3. Prerequisite: ARET 116.

Problems of wood frame structure, such as houses, details, and elementary design.

164. BUILDING MATERIALS. Class 3, cr. 3.
Properties and use of materials as found in building construction.

172. SYSTEMS OF CONSTRUCTION. Class 2, cr. 2.

Survey of different types of construction, including wood, steel, and reinforced concrete and curtain walls, considering the characteristics, advantages, and limitations.

BIOL—BIOLOGICAL SCIENCES

108. INTRODUCTION TO BOTANY. Class 3, Lab. 3, cr. 4.

Introduction to the growth, functioning, structures, heredity, diversity of plants, and their interactions with the environment.

109. INTRODUCTION TO ZOOLOGY. Class 2, Lab. 4, cr. 4.

Introduction to the structure, functioning, heredity, development, classification, and evolution of animals, and their interactions with the environment.

201. BIOLOGY OF MAN. Class 2, cr. 2.

Introduction to human biology with emphasis on anatomy and physiology.

202. LABORATORY IN HUMAN BIOLOGY. Lab. 2, cr. 1. Corequisite: BIOL 201.

203. BIOLOGY OF MAN. Class 2, cr. 2.
Continuation of BIOL 201.

204. LABORATORY IN HUMAN BIOLOGY. Lab. 2, cr. 1. Corequisite: BIOL 203.

205. BIOLOGY FOR ELEMENTARY SCHOOL TEACHERS. Class 2, Lab. 2, cr. 3.

Introduction to biology applicable to teaching in the elementary schools, including aspects of conservation, safety, nutrition, personal and public health.

206. BIOLOGY FOR ELEMENTARY SCHOOL TEACHERS. Class 2, Lab. 2, cr. 3.
Continuation of BIOL 205.

CHM—CHEMISTRY

100. ELEMENTARY CHEMISTRY. Sem. 1. Class 3, cr. 3.

Does not carry credit toward graduation in the schools of Engineering; Science;

and Humanities, Social Science and Education. Does not serve as a prerequisite to CHM 108, 110, 112, or 114.

An introductory chemistry course.

109. **GENERAL CHEMISTRY.** Class 3, Lab. 3, cr. 4.

Required for all freshmen in the pre-pharmacy option of the School of Science.

110. **GENERAL CHEMISTRY WITH QUALITATIVE ANALYSIS.** Class 2, Lab. 6, cr. 4.

Continuation of CHM 109 with laboratory work in qualitative analysis.

111. **GENERAL CHEMISTRY.** Class 2, Lab. 3, cr. 3.

Required for all freshmen registered in the School of Agriculture or in biology options of the School of Science who are not in CHM 115 or 117.

112. **GENERAL CHEMISTRY.** Class 2, Lab. 3, cr. 3.

Continuation of CHM III.

113. **INTRODUCTORY CHEMISTRY.** Class 2, Lab. 3, cr. 3.

Designed as a terminal course to create a background for those who do not ex-

pect to take further work in chemistry. With CHM 114, it satisfies the physical science requirement in the School of Humanities, Social Science, and Education.

114. **INTRODUCTORY CHEMISTRY.** Class 2, Lab. 3, cr. 3. Prerequisite: CHM 113 or equivalent.

Continuation of CHM 113.

115. **GENERAL CHEMISTRY.** Class 3, Lab. 3, cr. 4.

Required of students majoring in chemistry, physics, and engineering who do not take CHM 117-126.

Laws and principles of chemistry, with special emphasis on topics of importance in engineering. Numerical problems and relationships are introduced whenever quantitative treatment is possible.

116. **GENERAL CHEMISTRY.** Class 3, Lab. 3, cr. 4.

A continuation of CHM 115.

210. **PRINCIPLES OF ECONOMICS.** Class 3, cr. 3. Credit will be given for only one of ECON 210, 213, 215.

Study of the basic economic institutions, such as business, labor organizations, banks, and government. Analysis of the effects of competition, monopoly, and government on allocation of resources in pro-

duction and consumption; factors affecting size and growth of national income.

212. **PRINCIPLES OF ECONOMICS II.** Class 3, cr. 3.

Continuation of ECON 210. Emphasis on more thorough understanding of basic principles and their application to solving economic problems.

ECON—ECONOMICS

285. **EDUCATIONAL PSYCHOLOGY.** Class 3, cr. 3. Prerequisite: PSY 120.

An introduction to the application of psychology to education, with particular emphasis on human development and learning.

500. **AUDIO-VISUAL AIDS FOR TEACHERS.** cr. 2 or 3. Prerequisite: 12 hours of education and psychology.

Sources, selection, and effective use of audio-visual aids and preparation of audio-visual materials.

504. **INTRODUCTION TO MEASUREMENT AND EVALUATION.** Class 2, Lab. 2, cr. 3.

An introduction to the basic concepts and principles of management and evaluation with special emphasis on descriptive statistics, and on teacher-made and standardized tests.

510. **PRINCIPLES AND PROBLEMS OF VOCATIONAL AND EDUCATIONAL GUIDANCE.** Class 3, cr. 3. Prerequisite: 12 hours of psychology and education or equivalent professional training.

The development of vocational and educational guidance in the home, school, industry, and service organizations; consideration of the principles and present practices in such guidance.

ED—EDUCATION

518. EDUCATIONAL PROBLEMS OF TEACHERS. cr. 1-4.

Primarily for experienced teachers desiring credit from special workshops or individual study. Topics of individual study will deal with problems which arise from the professional work of classroom teachers.

530. ADVANCED EDUCATIONAL PSYCHOLOGY. Class 3, cr. 3. Prerequisite: ED 285.

Principles of learning evaluated in relation to current methods of instruction and to the result from research in education and psychology.

580. LIBRARY MATERIALS FOR CHILDREN. Class 3, cr. 3. Prerequisite: five hours of education and psychology.

The selection and use of library materials for children.

600. HISTORY AND PHILOSOPHY OF EDUCATION. Class 3, cr. 3. Prerequisite: 12 hours in education.

Consideration of the major ideas, trends, and movements in the development of American education.

620. SECONDARY SCHOOL CURRICULUM. cr. 2 or 3.

Objectives, organization, and administration of the secondary school curriculum.

626. ELEMENTARY SCHOOL CURRICULUM. Class 3, cr. 3. Prerequisite: 12 hours in education and psychology.

Needs of children and society; modern programs; procedures for developing a curriculum, including ways to improve the present offerings of a school.

627. REVIEW OF RESEARCH IN ELEMENTARY EDUCATION. cr. 3. Prerequisite: ED 430 or equivalent.

A study of research important generally to elementary education. Critical analysis of research in one area of special interest.

632. PUBLIC SCHOOL ADMINISTRATION. Class 3, cr. 3. Prerequisites: ED 285, 304, and 502.

Public school organization and administration, including school records and statistics.

110. DRAFTING FUNDAMENTALS. Class 1, Lab. 6, cr. 3.

Designed for teachers of drawing. A basic course in drawing; orthographic projection, pictorial sketching, print reading, and reproduction of drawings. Problems designed to require practical reasoning and develop good techniques.

111. ADVANCED DRAFTING. Class 1, Lab. 6, cr. 3. Prerequisite: EG 110.

Preparation of assembly and detail drawings, including fasteners, limit dimensioning, and shop notes. Intersections and developments with sheet metal applications. Symbols and construction details used in architectural drafting.

113. SLIDE RULES AND GRAPHS. Lab. 2, cr. 1. Prerequisite or corequisite: MA 153 or 151.

Principles and use of the slide rule for division, multiplication, trigonometry, powers, and roots. Properties and types of coordinate graphs for scientific and engineering purposes; calculation and plotting graphs: uniform, log, semilog, and others.

118. ENGINEERING GRAPHICS. Class 1, Lab. 6, cr. 3. Prerequisite or corequisite: MA 151 or 161.

Graphical methods used in engineering design, layout, and calculation. Multiview and pictorial drawing and sketching of technical objects; basic dimensioning practice; conventional representation.

EG—ENGINEERING GRAPHICS

ENGL—ENGLISH

101. ENGLISH COMPOSITION I. Class 3, cr. 3. Prerequisite to all courses in English except ENGL 2, 3, 103, and 185.

Purpose: to develop competence in written expression through directed practice in writing. Emphasis on problems of mechanics and organization.

102. ENGLISH COMPOSITION II. Class 3, cr. 3. The second half of the basic composition course. Emphasis on problems of diction and logical analysis.

A student who has received a grade of A in ENGL 101 may, with the approval of the head of his school, substitute for ENGL 202 an elective course in English.

103. ENGLISH COMPOSITION. Class 3, cr. 3.

A composition course for freshmen provisionally excused from ENGL 101 on the basis of orientation tests. The course attempts to develop writing on a high critical level, improve reading tastes, and arouse an interest in the humanities and conflicting intellectual attitudes. Credit in the course may not be established by examination.

185. DEVELOPMENTAL READING. Lab. 2, cr. 1.

Purpose: to increase reading efficiency by improving comprehension and by developing the motor skills involved in reading speed. Motivates reading interest through use of films and pacers.

240. INTRODUCTION TO THE LITERATURE OF ENGLAND: FROM THE BEGINNINGS TO SWIFT AND POPE. Class 3, cr. 3.

A survey with emphasis on the study of selected texts from the major writers, this course aims at both competence in literary analysis and awareness of the relation between each writer and his times. Required of all students majoring in English.

241. INTRODUCTION TO THE LITERATURE OF ENGLAND: FROM THE RISE OF ROMANTICISM TO THE TWENTIETH CENTURY. Class 3, cr. 3.

A continuation of ENGL 240, this course carries the same study from the mid-eighteenth to the twentieth century. Required of all students majoring in literature.

285. CRITICAL READING. Class 2, cr. 2. Prerequisite: ENGL 185 or consent of instructor.

Close reading of selected current magazines and newspapers, emphasizing efficient techniques for finding general meaning. Includes the application of elementary logical and semantic analysis.

286. VOCABULARY BUILDING. Lab. 2, cr. 1.

Development of vocabulary through study of the characteristics of the language, usage, and word formation; exercises and dictionary practice; selected readings.

350. A SURVEY OF AMERICAN LITERATURE TO WHITMAN. Class 3, cr. 3. Not open to students who have credit for ENGL 250.

Selected writings of all major authors—such as Franklin, Emerson, Hawthorne—and some minor writers are read and discussed as to their individual qualities, the forces exerted on them, and their expression of the American mind and character. Required of all students majoring in American literature.

351. A SURVEY OF AMERICAN LITERATURE FROM WHITMAN TO THE PRESENT. Class 3, cr. 3. Not open to students who have credit for ENGL 250.

Continuation of ENGL 350. Required of all students majoring in American literature.

455. MAIN CURRENTS OF AMERICAN THOUGHT. Class 3, cr. 3.

A survey of dominant ideas and intellectual trends in America from 1607 to the present as revealed through American literature and as related to American life and culture.

471. THE ENGLISH NOVEL. Class 3, cr. 3.

Studies in the historical development of the English novel, with reading and discussion of representative works of the eighteenth and nineteenth centuries.

472. THE AMERICAN NOVEL. Class 3, cr. 3.

Reading and discussion of representative American novels from Hawthorne to Faulkner, emphasizing major trends in purpose, content, and technique. Supplementary lectures on background materials.

554. THE AMERICAN RENAISSANCE. Class 3, cr. 3.

A survey of American literature from about 1820 to 1855, concluding with Melville.

ENGR—ENGINEERING

100. **FRESHMAN ENGINEERING LECTURES.** Class 1, cr. 1.

An introduction to the engineering profession.

FR—FRENCH

101. **FIRST COURSE IN FRENCH.** Class 3, Lab. 1, cr. 3. For beginners only.

Unless recommended by the head of the school in which the student is registered, a student may not apply toward graduation the credit for FR 101 without satisfactorily completing a more advanced course in French.

102. **SECOND COURSE IN FRENCH.** Class 3, Lab. 1, cr. 3. Prerequisite: FR 101 or equivalent.

Continuation of FR 101.

203. **THIRD COURSE IN FRENCH.** Class 3, cr. 3. Prerequisite: FR 102 or equivalent.

Readings from works of modern and contemporary French writers; practice in speaking and writing French.

204. **FOURTH COURSE IN FRENCH.** Class 3, cr. 3. Prerequisite: FR 203 or equivalent.

Continuation of FR 203.

GER—GERMAN

101. **FIRST COURSE IN GERMAN.** Class 3, Lab. 1, cr. 3. For beginners only.

Unless recommended by the head of the school in which the student is registered, a student may not apply toward graduation the credit for GER 101 without satisfactorily completing a more advanced course in German.

102. **SECOND COURSE IN GERMAN.** Class 3, Lab. 1, cr. 3. Prerequisite: GER 101 or equivalent.

Continuation of GER 101.

203. **THIRD COURSE IN GERMAN.** Class 3, cr. 3. Prerequisite: GER 102 or equivalent.

Readings from the works of nineteenth century and contemporary German writers; practice in speaking and writing German.

204. **FOURTH COURSE IN GERMAN.** Class 3, cr. 3. Prerequisite: GER 203 or equivalent.

GNT—GENERAL STUDIES, TECHNOLOGY

100. **TECHNICAL INSTITUTE ORIENTATION LECTURES.** Class 1, cr. 1.

The organization and services of the university related to the student. The relationships of the engineers, technicians, and tradesmen to one another and to industry. The development and function of the technical institutes and of the separate technologies. Guidance in adapting to the university and preparation for industrial jobs.

204. **FUNDAMENTALS OF PRACTICAL SPEAKING.** Class 2, cr. 2.

Organization and presentation of ma-

terial, voice and physical delivery, audience reaction.

220. **TECHNICAL REPORT WRITING.** Class 3, cr. 3.

Extensive application of the principles of good writing in industrial reporting, with emphasis on the techniques of presenting information graphically as well as in a clear, concise written form.

232. **DEMOCRATIC GOVERNMENT.** Class 2, cr. 2.

A study of the development of democratic government in the U.S. and other democratic areas of the world.

240. LABOR RELATIONS PROBLEMS. Class 3, cr. 3.

Problems of workers with possible solutions as suggested by organized labor and management. Regulations concerning management, labor, the collective bargaining agreement, grievance and arbitration procedures.

260. ECONOMICS OF INDUSTRY. Class 2, cr. 2.

Fundamental economics principles which affect everyone, with particular emphasis upon their application to industry.

264. CONFERENCE SPEAKING. Class 2, cr. 2. Prerequisite: GN 204.

Training and practice in conducting and participating in small group conferences, shop committees, instructional groups, problem-solving groups.

268. ELEMENTS OF LAW. Class 3, cr. 3.

An introductory law course, with a brief comparison of the American federal system and the parliamentary system of government; and covering law, with emphasis on judicial review, court jurisdiction, and procedure generally and basic law in particular.

HIST—HISTORY

200. EARLY CIVILIZATION. Class 3, cr. 3. (el.).

A survey of European development from earliest times through the sixteenth century, this course is designed to meet the needs of the beginning student in European and world history.

201. DEVELOPMENT OF MODERN CIVILIZATION. Class 3, cr. 3.

A continuation of HIST 200, this course traces the expansion of Europe into the Americas, Africa, and Asia. The French Revolution, nationalism, and the development of Western European states from the sixteenth century to the present are studied.

251. AMERICAN HISTORY TO 1865. Class 3, cr. 3.

A study of the development of American political, economic, and social institutions from the early explorations and colonial settlements to the conclusion of the Civil War.

252. THE UNITED STATES AND ITS PLACE IN WORLD AFFAIRS. Class 3, cr. 3.

A study of the growth of the United States from the period of the Reconstruction to the present. The new industrialism, agrarian problems, territorial expansion, the two world wars, depression, the New Deal, and similar topics are analyzed.

IET—INDUSTRIAL ENGINEERING TECHNOLOGY

104. INDUSTRIAL ORGANIZATION AND PRODUCTION. Class 4, cr. 4.

A detailed survey of organizational structures; operational, financial, marketing, and accounting activities; duties of management, planning, control, personnel, safety, wages, policy, and human factors necessary for effective management.

110. ELECTRONIC DATA PROCESSING. Class 3, cr. 3.

An introduction to data processing through the use of punched card and high-speed computer equipment. Surveys computers, techniques of problem solving and programming, typical computer applications and devaluation of proposed systems.

120. SYSTEMS AND PROCEDURES. Class 3, cr. 3.

152. HUMAN RELATIONS IN INDUSTRY. Class 3, cr. 3.

Study of the bases of human relations and the organization of individual and group behavior. Special emphasis on typical industrial and business relationships in everyday situations. Examines fundamental relationships between behavior and personal and group forces.

200. COMPUTER PROGRAMMING FUNDAMENTALS. Class 3, cr. 3.

The descriptive presentation of the basic elements of programming digital computers. There is a treatment of absolute and symbolic coding or instruction;

addressing; editing; printing control; magnetic tape functions; random access and sequential processing; and mathematical and universal programming concepts.

204. TECHNIQUES OF MAINTAINING QUALITY. Class 2, Lab. 3, cr. 3. Prerequisite: IT 104; prerequisite or corequisite: MA 154.

An analysis of the basic principles of inspection and the study of the various techniques and types of equipment connected with inspection processes. Includes methods of using mechanical, electronic, air and light devices for checking and measuring and other related techniques to determine quality levels of acceptance.

208. INTEGRATED SYSTEMS ANALYSIS. Class 3, cr. 3.

Presents the concept of the management operating system; the organization as a system's model; operation research; systems administration; information and automatic production; selection, training, and organization of personnel; and project teams within the formal structure.

212. INDUSTRIAL SAFETY. Class 2, cr. 2. Prerequisite: IT 104.

Safety fundamentals as related to the economics of accident prevention, analysis of accident causes, mechanical safeguards, fire prevention, plant housekeeping, occupational diseases, first aid, safety organization, protective equipment, and the promotion of safe practices.

224. PRODUCTION PLANNING AND CONTROL. Class 3, Lab. 3, cr. 4. Prerequisites: DM 180 and IT 152.

Preproduction planning of the most economical methods, machines, operations, and materials for the manufacture of a product. The planning, scheduling, routing, and detailed procedure of production control.

227. PRODUCTION PLANNING AND CONTROL. Class 3, cr. 3. Prerequisites: DM 180 and IT 152.

Preproduction planning of the most economical methods, machines, operations, and materials for the manufacture of a product. The planning, scheduling, routing, and detailed procedure of production control. (Same as IT 224 without laboratory.)

244. FUNDAMENTALS OF PRODUCTION COST. Class 1, Lab. 3, cr. 2. Prerequisite: IT 104.

Fundamental mechanics (rules for debit and credit) of accounting, principles of account classification, business forms and procedures, financial and operating statements, and elements of cost accounting—all from the viewpoint of industrial organization.

248. PRODUCTION COST ANALYSIS. Class 1, Lab. 3, cr. 2. Prerequisite: IT 244.

Specific applications of production cost theories to principles developed through study of selected case problems.

250. FUNDAMENTALS OF PRODUCTION COST ANALYSIS. Class 2, Lab. 3, cr. 3. Prerequisite or corequisite: IT 104, except by approval of the technology chairman.

Surveys of fundamental mechanics of accounting principles of account classification, financial and operating statements, and the generation of cost data according to cost accounting principles. Surveys the generation of cost data according to the principles of engineering economy. Examines applications of cost accounting data and engineering economy cost data to specific management decision areas through selected case problems.

260. MOTION AND TIME STUDY. Class 2, Lab. 3, cr. 3. Prerequisites: IT 152, DM 180, and MA 154.

Techniques of motion and time study, process charts, operation charts, multiple activity charts, micromotion study, therbligs, and stop-watch time study.

262. MOTION STUDY AND WORK METHODS. Class 2, Lab. 3, cr. 3. Prerequisite: IT 152; prerequisite or corequisite: MA 154 or equivalent.

The study of the various techniques of motion study including process charts, operation charts, multiple activity charts, micro and memo motion study, therbligs, the movie camera, along with actual practice in their use. Includes study and application of the basic principles used to develop better methods of performing work.

266. WORK MEASUREMENT AND INCENTIVES. Class 2, Lab. 3, cr. 3. Prerequisite: IT 262.

A study of the fundamentals of time study and work measurement with actual practice in their use. Includes stop watch time study, measuring work with movie camera, the establishment of allowances by both stop watch and work sampling studies, the establishment and use of pre-determined time values, and the construction and use of work measurement formulae.

268. PLANT LAYOUT. Class 2, Lab. 3, cr. 3. Prerequisites: EG 110, IT 224 and 260.

Arrangement of stock, machines, layout of aisles, and use of space, and material handling for the highest efficiency of production.

272. JOB EVALUATION. Class 2, cr. 2. Prerequisites: IT 152 and MA 154.

A survey of the basic principles and significance of job evaluation. An analysis of current practices and techniques used in job analysis, job descriptions, and job evaluation.

280. WAGE INCENTIVES. Class 2, cr. 2. Prerequisites: IT 260 and 272.

An analysis and study of various types of wage incentive plans, their significance, adaptability, effectiveness, and equitability. A systematic appraisal of the basic objectives and currently used techniques in the administration of wage incentive programs.

296. INDUSTRIAL TECHNOLOGY CASE PROBLEMS. Class 2, cr. 2.

Application of theories developed in the several industrial technology courses to selected general case problems—to provide practice in the integration of principles.

INDM—INDUSTRIAL MANAGEMENT

200. INTRODUCTORY ACCOUNTING. SS. Class 3, cr. 3. (Required of undergraduate students in pre-industrial management and industrial economics.)

Introduction to the fundamentals of accounting.

201. COST ACCOUNTING. Class 3, cr. 3. Prerequisite: INDM 200 or equivalent.

Nature of cost accounting; job orders, process, and standard cost methods. Preparation and uses of various types of cost reports.

MA—MATHEMATICS

1. HIGH SCHOOL ALGEBRA. Class 1-5, cr. 0. Credit: one unit for admission.

2. PLANE GEOMETRY. Class 5, cr. 0. Credit: one unit for admission.

4. ADVANCED HIGH SCHOOL ALGEBRA. Class 2, cr. 0. Credit: one-half unit for admission.

For engineering students with an entrance deficiency in this subject.

123. ELEMENTARY CONCEPTS OF MATHEMATICS I. Class 3, cr. 3. Not open to students with credit in MA 133.

Numeration system; natural numbers; mathematical systems; mathematical reasoning; elementary set theory; elementary logic; mathematical proof; the number system of arithmetic; arithmetic algorithms.

124. ELEMENTARY CONCEPTS OF MATHEMATICS II. Class 3, cr. 3. Prerequisite: MA 123. Not open to students with credit in MA 133.

The system of integers; rational numbers; polynomials; the real and complex number systems; elements of plane geometry; relations, functions, and graphs; elements of analytic geometry.

133. MATHEMATICS FOR ELEMENTARY TEACHERS I. Class 4, cr. 4. Not open to students with credit in MA 123.

Numeration systems; finite mathematical systems; abstract mathematical systems, groups, fields; natural numbers through rationals, a structural approach, properties, algorithms; mathematical reasoning and proof.

The sequence MA 133-134 fulfills the mathematics requirements for elementary education majors. MA 123-124 may be substituted for MA 133 in meeting this requirement.

134. MATHEMATICS FOR ELEMENTARY TEACHERS II. Class 4, cr. 4. Prerequisite: MA 133 or MA 124.

Informal study of metric and non-metric properties of geometric figures (primarily in a plane), measurement; introduction to foundations of Euclidean geometry.

The sequence MA 133-134 fulfills the mathematics requirements for elementary education majors. MA 123-124 may be substituted for MA 133 in meeting this requirement.

151. ELEMENTARY MATHEMATICS FOR ENGINEERING AND THE PHYSICAL SCIENCES. Class 5, cr. 5. Not open to students with credit in MA 153 or MA 154.

College algebra and trigonometry for students with inadequate preparation for MA 161. Does not carry credit toward graduation in the Schools of Engineering or the Division of Mathematical Sciences.

153. ALGEBRA AND TRIGONOMETRY I. Class 3, cr. 3. MA 153-154 is a two-semester version of MA 151.

Not open to students with credit in MA 151. Does not carry credit toward graduation in the Schools of Engineering and the Division of Mathematical Sciences.

154. ALGEBRA AND TRIGONOMETRY II. Class 3, cr. 3. Continuation of MA 153.

Not open to students with credit in MA 151. Does not carry credit toward graduation in the Schools of Engineering and the Division of Mathematical Sciences.

161. MATHEMATICS FOR ENGINEERING AND THE PHYSICAL SCIENCES I. Class 5, cr. 5. Analytic geometry and calculus; derivatives of algebraic functions.

Required of all students majoring in mathematics, physics, chemistry and engineering. Students with inadequate preparation will be required to take MA 151.

162. MATHEMATICS FOR ENGINEERING AND THE PHYSICAL SCIENCES II. Class 5, cr. 5. Prerequisite: MA 161.

Calculus: Integrals, applications of derivatives and integrals. Formal integration.

223. INTRODUCTORY ANALYSIS I. Class 3, cr. 3. Prerequisite: MA 151 or equivalent. Should be preceded by MA 214.

Elementary properties of algebraic systems; the real number system; analytic geometry, differential and integral calculus of one variable. Applications to problems in the biological and social sciences.

224. INTRODUCTORY ANALYSIS II. Class 3, cr. 3. Must be preceded by MA 223.

Partial derivatives; calculus of finite differences; differentials; multiple integrals; introduction to difference and differential equations. Applications to problems in the biological and social sciences.

MET—MECHANICAL ENGINEERING TECHNOLOGY

156. GRAPHICAL COMPUTATIONS. Class 1, Lab. 6, cr. 3. Prerequisite: EG 110; prerequisite or corequisite: MA 154.

Descriptive and analytic geometry principles applied to the solution of engineering problems; intersections and development of planes and solids; layout of objects in space; and determination of clearances between objects in space.

180. MATERIALS AND PROCESSES. Class 3, cr. 3.

Application and characteristics, both physical and chemical, of the materials

most commonly used in industry; the mechanical processes by which materials may be shaped or formed.

204. PRODUCTION DRAWING. Class 1, Lab. 6, cr. 3. Prerequisite: EG 110; prerequisite or corequisite: DM 180.

Preparation of working drawings from layouts, drafting simplification, functional dimensioning, assembly drawings, detailing of machine elements, working with manufacturers' catalogs, applying fits, limits and tolerances to dimensions for interchangeable manufacture; information

as to material, physical treatment, and manufacturing processes. The student works from layouts with a minimum of information so that self reliance in detailing may be developed.

212. **MECHANICS OF MATERIALS.** Class 4, cr. 4. Prerequisite: PST 136; prerequisite or corequisite: MA 154.

210. **INTRODUCTION TO PHILOSOPHY.** Class 3, cr. 3.

The basic problems and types of philosophy, with special emphasis upon the problem of knowledge and nature of reality.

May be applied toward meeting the philosophy requirement of the School of Humanities, Social Science, and Education.

211. **ETHICS.** Class 3, cr. 3.

An examination of the nature of moral

Forces acting on rigid bodies at rest and in motion—embracing vectors, force and moment laws of equilibrium for various force systems, centroids, center of gravity and moments of inertia, stress and strain, riveted and welded joints, torsion, shear, bending and deflection of beams, combined stresses and columns.

PHIL—PHILOSOPHY

values and a brief consideration of the basic problems involved in the philosophy of art. May be applied toward meeting the philosophy requirement of the School of Humanities, Social Science, and Education.

250. **PRINCIPLES OF LOGIC.** Class 3, cr. 3.

The theory and practice of deductive reasoning; immediate inference, the syllogism, hypothetical and disjunctive inference. Particular attention to semantic fallacies as embodied in current literature.

PHYS—PHYSICS

152. **MECHANICS AND SOUND.** Class 3, Lect.-Dem. 1, Lab. 2, cr. 4. Must be preceded or accompanied by MA 162.

Statics; uniform and accelerated motion; Newton's laws; circular motion; energy, momentum, and conservation principles; dynamics of rotation; gravitation and planetary motion; elasticity; simple harmonic and wave motion; hydrostatics; hydrodynamics; intermolecular forces.

210. **THE NATURE OF PHYSICAL SCIENCE I.** Class 2, Lab. 3, cr. 3.

Development of basic concepts and theories in physical science; a terminal course.

211. **THE NATURE OF PHYSICAL SCIENCE II.** Class 2, Lab. 3, cr. 3. Prerequisite: PHYS 210 or equivalent.

Continuation of PHYS 210. PHYS 210 and 211 will satisfy the physical science requirement in the School of Humanities, Social Science, and Education.

POL—POLITICAL SCIENCE

101. **INTRODUCTION TO GOVERNMENT.** Class 3, cr. 3.

The problems of government as illustrated by American national government. Attention to political theory as well as to the organization and problems of government.

102. **INTRODUCTION TO GOVERNMENT.** Class 3, cr. 3. Prerequisite: POL 101.

State and local government: powers, re-

lationships, and problems of administration, with emphasis on the Middle Western States.

331. **INTERNATIONAL RELATIONS.** Class 3, cr. 3.

Introductory survey of the underlying forces in international relations, the foreign policies of the great powers, and agencies of control and cooperation.

PST—PHYSICAL SCIENCES, TECHNOLOGY

120. INTRODUCTION TO CHEMISTRY. Class 2, Lab. 3, cr. 3. Prerequisite or corequisite: MA 153.

The general basic principles of chemistry, including a study of important elements and their simpler compounds. Special emphasis is placed on industrial applications.

136. PHYSICS: MECHANICS AND HEAT. Lect. 2, Rec. 2, Lab. 2, cr. 4. Prerequisite or corequisite: MA 153.

Work, energy, power, efficiency of simple machines; equilibrium conditions for solids, liquids, and gases; straight line and rotational motion—uniform and accelerated motion. Elementary principles of heat and their technical applications.

176. PHYSICS: ELECTRICITY, SOUND, AND LIGHT. Lect. 2, Rec. 2, Lab. 2, cr. 4. Prerequisite: PST 136, except ET students. Fundamental principles of electricity, wave motion, sound, and light.

PSY—PSYCHOLOGY

120. ELEMENTARY PSYCHOLOGY. Class 3, cr. 3.

Introduction to the fundamental principles of psychology, covering particularly the topics of personality, intelligence, emotion, attention, perception, learning, memory, and thinking.

235. CHILD PSYCHOLOGY. Class 3, cr. 3. Prerequisite: PSY 120 or equivalent.

Age-level characteristics and needs of children from birth to the teens in motor control, language, learning, play, etc.; interpersonal relations and other factors affecting children.

340. GENERAL SOCIAL PSYCHOLOGY. Class 3, cr. 3. Prerequisite: six hours of psychology, or three hours of psychology and three hours of sociology. GS 234 may be included as three hours of sociology. (Same as SOC 340.)

Conditions and consequences of human behavior in social situations, with emphasis upon the mechanism and the process on the bases of which socialization takes place.

350. ABNORMAL PSYCHOLOGY. Class 3, cr. 3. Prerequisite: three hours of psychology.

Various forms of mental disorder from the standpoint of their origin, treatment, prevention, social significance, and relation to problems of normal human adjustment.

370. PSYCHOLOGY IN BUSINESS AND INDUSTRY. Class 3, cr. 3.

Applications of principles of behavior to human problems in business and industry, with emphasis upon leadership, employee motivation, communications, selection and training, and job environment.

500. STATISTICAL METHODS APPLIED TO PSYCHOLOGY, EDUCATION, AND SOCIOLOGY. Class 2, Lab. 2, cr. 3.

532. PSYCHOLOGY OF THE EXCEPTIONAL CHILD. Class 3, cr. 3. Prerequisite: six hours of psychology.

Principles of diagnostic testing, adaptive teaching, and guidance applied to the improvement of teaching and to the correction of learning difficulties of exceptional children.

534. PSYCHOLOGY OF ADOLESCENCE. Class 3, cr. 3. Prerequisite: six hours of psychology.

Development during the teens, with special reference to general life problems facing youth of these ages, and an investigation into ways and means of helping youth to meet its problems constructively.

537. MENTAL HYGIENE IN EDUCATION. Class 3, cr. 3. Prerequisites: PSY 120 and ED 285.

SOC—SOCIOLOGY

100. INTRODUCTORY SOCIOLOGY. Class 3, cr. 3. May not be taken for credit by students of junior or senior standing.

A survey course designed to introduce the student to the science of human so-

ciety. Fundamental concepts, description and analysis of society, culture, the socialization process, social institutions, and social change.

220. SOCIAL PROBLEMS. Class 3, cr. 3.
Prerequisite: SOC 100 or 312, or equivalent.

Analysis of problem conditions in modern society—family disorganization, racial conflicts, class struggle, mental illness, narcotic addiction, gambling, alcoholism, and others. Social factors involved in the development, continued existence, and amelioration of these conditions.

312. AMERICAN SOCIETY. Class 3, cr. 3.
Students with freshman standing will not be permitted in this course without special permission.

An introduction to sociological perspective. Detailed consideration of the fundamental structure, social changes, and related problems of the major American institutions; family economic order, political organization, education and religion.

334. URBAN SOCIOLOGY. Class 3, cr. 3.
Prerequisite: SOC 100 or 312, or equivalent.

Development of the city and its functions; types of social behavior in cities; influences of city life on personality; city planning.

340. GENERAL SOCIAL PSYCHOLOGY. Class 3, cr. 3. Prerequisite: three hours of psychology, sociology, or equivalent.

Conditions and consequences of human behavior in social situations, emphasis upon the mechanism and the processes on the basis of which socialization takes place.

341. CULTURE AND PERSONALITY. Class 3, cr. 3. Prerequisite: three hours of anthropology, sociology, child development, or psychology, or equivalent.

A cross-cultural survey stressing differing basic personality types and the processes by which adult personality is acquired. Case studies of selected non-Western cultures will be used to provide comparative perspective.

350. MARRIAGE AND FAMILY RELATIONSHIP. Class 3, cr. 3.

Designed to provide further understanding of family relationships for those unmarried, those contemplating marriage, those married, and prospective counselors of all of them. A functional approach to the interpersonal relationships of courtship, marriage, and family life. Open to both men and women.

SPAN—SPANISH

101. FIRST COURSE IN SPANISH. Class 3, Lab. 1, cr. 3.

For students who have had no previous work in Spanish.

102. SECOND COURSE IN SPANISH. Class 3, Lab. 1, cr. 3. Prerequisite: SPAN 101 or equivalent.

203. THIRD COURSE IN SPANISH. Class 3, cr. 3. Prerequisite: SPAN 102 or equivalent.

Readings from the works of nineteenth century and contemporary Spanish writers; practice in speaking and writing Spanish.

204. FOURTH COURSE IN SPANISH (READING). Class 3, cr. 3. Prerequisite: SPAN 203 or equivalent.

Primary emphasis on reading, but some practice in speaking.

SPE—SPEECH

114. PRINCIPLES OF SPEECH. Class 3, cr. 3.

sis on speeches related to the student's major vocational area.

314. ADVANCED PUBLIC SPEAKING. Class 3, cr. 3. Prerequisite: SPE 114 or 116.

Development of a marked degree of skill in the composition and delivery of various types of speeches; special empha-

320. GROUP DISCUSSION. Class 3, cr. 3. Prerequisite: SPE 114 or 116.

A study of group thinking and problem-solving methods; participation in and evaluation of committee and informal discussion groups.

ADMINISTRATIVE AND INSTRUCTIONAL STAFF

- GEORGE R. AVERITT (1961).....Lecturer
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- HOWARD D. MURDOCK (1946)....Associate
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- ARNOLD O. MYHRE (1961).....Lecturer
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- THOMAS R. NUNN (1946).....Associate
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A.B., Central Michigan, 1935; A.M., Michigan,
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- ROBERT F. SCHWARZ (1952)....Director of
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- LAWRENCE T. TANBER (1952)....Lecturer
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A.T.A., Purdue, 1951.
- MELVIN YODER (1956).....Lecturer in
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1964-65

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